MALVACEAE OF JAMMU AND KASHMIR STATE, INDIA[1]

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Abstract

The Malvaceae of the Jammu and Kashmir State are reviewed with a complete synopsis of the taxa recorded from this area. The state is situated on the northern fringe of India and comprises three distinct geographical regions: Jammu, Kashmir, and Ladakh. The family has a moderate representation here, but only a relatively few species are indigenous. Forty-one species in 15 genera are recorded in this treatment: 12 species cultivated (with at least half of them escaped from cultivation) and 29 wild species. A definite decline in the number of taxa of Malvaceae has been observed from the subtropical Jammu region through the temperate Kashmir to the cold, arid Ladakh. Malva bucharica *and* Althaea broussonetiifolia *are recorded for the first time from the Indian subcontinent;* Malva microcarpa, M. ambigua, *and* M. mohileviensis *for the first time from India; and* Hibiscus micranthus *is a new record for Jammu and Kashmir State. All the taxa are keyed, and the species are provided with descriptions and usually followed by brief notes on distribution and economic utility.*

In Hooker's *Flora of British India* (1874), Masters recognized 108 malvaceous species in 27 genera and sorted these into four tribes: Malveae, Ureneae, Hibisceae, and Bombaceae. As the tribe Bombaceae is now referred to family Bombacaceae, 97 species in 19 genera remain from Masters's listing. Of these, ten species in seven genera were cited from Jammu and Kashmir State. Many additional species have been described from this area since Hooker's publication, and the nomenclature of most of the species included there has changed.

Lambert (1933), in his list of trees and shrubs for the Jammu and Kashmir forest circles, listed the then-known arborescent taxa of the family. Stewart (1972) catalogued 70 species in 16 genera in West Pakistan and Kashmir. Of these, 30 species in 12 genera, including those based on literature, were listed from the Jammu and Kashmir State. Following Stewart, Abedin (1979) monographed the Malvaceae of West Pakistan, listing 94 specific and infraspecific taxa in 19 genera. However, Jammu and Kashmir materials are poorly represented in this work. Many of the collections referred by Stewart to our state are not mentioned by Abedin.

Lately, many local workers have included the family in floristic works (Javeid, 1970; Javeid & Naqshi, 1973; Singh & Kachroo, 1976; Sharma & Kachroo, 1981; Naqshi & Kachroo, 1982; Dar et al., 1983; Dhar & Kachroo, 1983), but none has given a descriptive account of all the taxa. Therefore, a complete synopsis of the family as it occurs in the Jammu and Kashmir State is given here.

The state is situated on the northern fringe of India between 32°10′ and 37°10′N latitudes and 72°30′ and 80°30′E longitudes. The eastern, northern, and western boundaries of the state comprise a segment of the border of India. To the east of the state lies Tibet, to the north lies China (with a very small portion of the border touching Afghanistan), to the west is Pakistan, and to its south is Himachal Pradesh and a very small part of the Punjab. It covers an area of about 222,000 km^2, which, except for a short belt in Jammu and the valley of Kashmir, is wholly mountainous, from ca. 270 m in Jammu and extending to the heights of the Himalaya in Kashmir and Ladakh (up to ca. 8,128 m at Nanga Parbat). The rock formations in the entire state belong to three broad groups: the Panjal, the Zanskar, and the Tertiary. The Panjal includes the outer hills, outer plains, and the middle mountains; the Zanskar includes the whole of the eastern region from Spiti to Lahul and to the lofty Karakoram in the north; and the Tertiary includes the valley of Kashmir and other river valleys (Wadia, 1953).

[1] *Dr. Paul A. Fryxell, Research Botanist, Agronomy Field Laboratory, Texas A&M University, U.S.A., has been kind enough to read the manuscript and confirm identities of the representative taxa included in this treatment. He also supplied useful literature and made helpful suggestions. For all this generous help we are very grateful. Thanks are also due to Professors E. Nasir and S. I. Ali of Pakistan for providing literature.*

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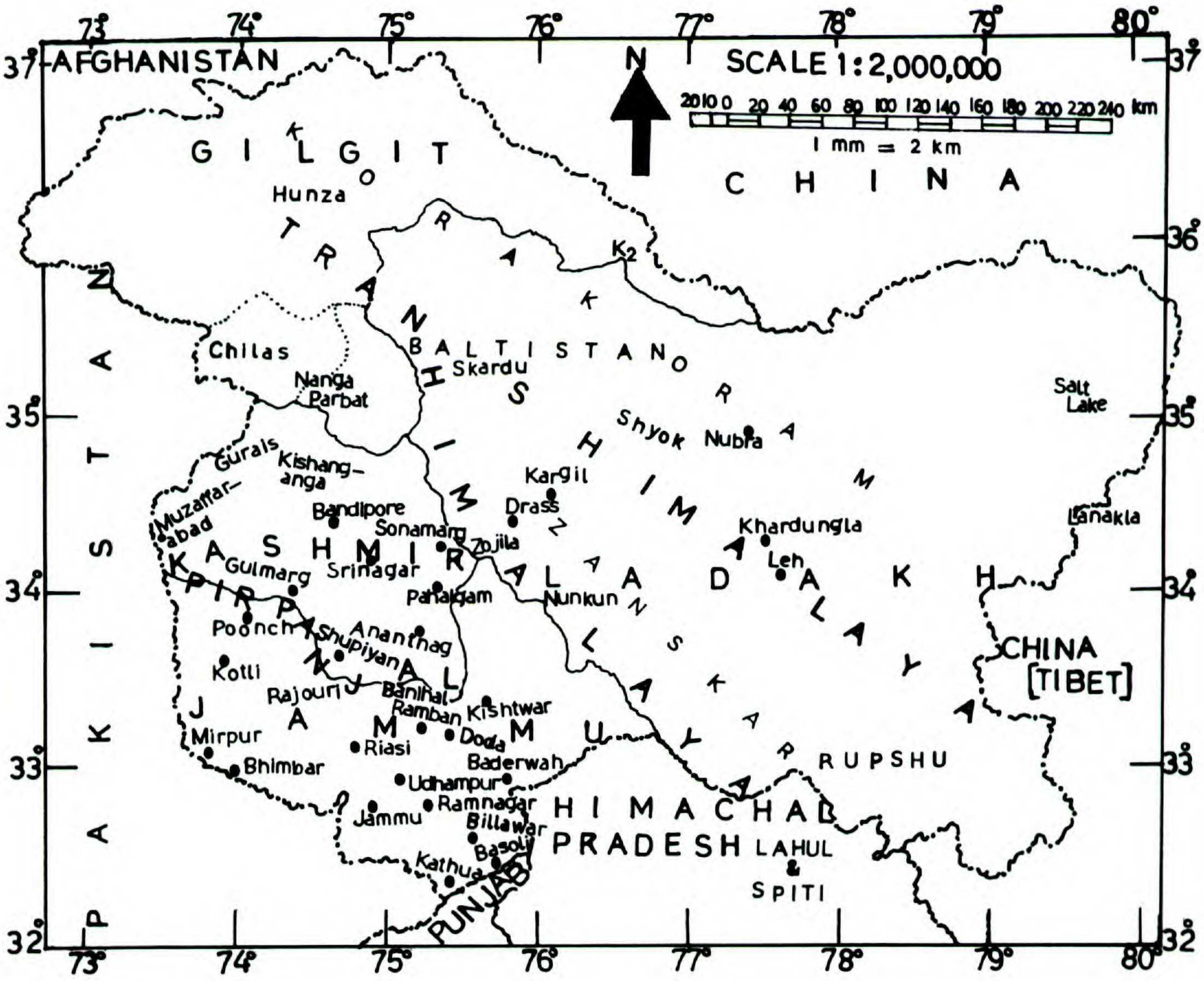

FIGURE 1. Map of Jammu and Kashmir State.

Geographically the state can be divided into three distinct regions, Jammu, Kashmir, and Ladakh (Fig. 1), embracing considerable variation in topography, physiography, and climate. Jammu has mostly a subtropical climate (moist temperate in higher reaches of Chenab Valley), with the southwest monsoons resulting in an average annual rainfall of over 1,100 mm. The mean maximum temperature during summer is as high as 40°C, and the mean minimum during winter as low as 6°C. Floristically the region is largely dominated by broad-leaved, deciduous and evergreen woody elements. Kashmir (separated from the Jammu region by the lofty Pir Panjal range, which also acts as a barrier to the southwest monsoons) is predominantly dry temperate, with an average annual rainfall of ca. 660 mm. The maximum temperature in summer reaches 35°C, and the minimum in winter (usually with heavy snowfalls) decreases to as low as −10°C. The fewer woody genera in Kashmir are evergreen—broad-leaved arborescent species are usually lacking. Ladakh, an extremely barren land with high elevations (above 3,000 m), has a cold, arid climate, approaching arctic cold in winter. The average annual rainfall varies between 80 mm (Leh) and 650 mm (Drass). The temperature in summer goes as high as 30°C and as low as −40°C in winter. The region harbors a desert flora largely dominated by xerophytic elements and, except for more humid valleys, almost lacks natural tree cover.

Materials and Methods

Almost all the collections cited in this work were critically examined in the herbarium of the University of Kashmir (KASH) by the authors. The herbarium studies were supplemented by extensive observations in the field. Representative specimens of all our determinations were kindly seen by Dr. Paul A. Fryxell, U.S.A. However, a few collections, mostly made in the Pakistan-occupied part of Jammu and Kashmir State and deposited in various herbaria of Pakistan, were not accessible, and they

TABLE 1. *Distribution of the malvaceous species recorded from Jammu and Kashmir State.*

Genus	Total Number of Species Recorded	No. of Species Recorded from			Number of Species Common Between			
		Jammu	Kash-mir	Ladakh	Jammu & Kashmir	Kashmir & Ladakh	Jammu & Ladakh	Jammu, Kashmir & Ladakh
Fioria	1 (—)[1]	1	—	—	—	—	—	—
Hibiscus	6 (2)	5	2	—	1	—	—	—
Abelmoschus	3 (1)	3	1	—	1	—	—	—
Kydia	1 (—)	1	—	—	—	—	—	—
Gossypium	2 (2)	—	2	—	—	—	—	—
Thespesia	1 (—)	1	—	—	—	—	—	—
Malva	9 (3)	4	8	6	3	6	3	3
Althaea	2 (—)	—	2	—	—	—	—	—
Alcea	3 (3)	1	3	—	1	—	—	—
Lavatera	1 (—)	1	1	—	1	—	—	—
Abutilon	4 (—)	3	1	—	—	—	—	—
Sida	5 (—)	5	—	—	—	—	—	—
Malvastrum	1 (—)	1	—	—	—	—	—	—
Urena	1 (—)	1	—	—	—	—	—	—
Sidalcea	1 (—)	—	1	—	—	—	—	—
Grand total	41 (12)	27	21	6	7	6	3	3

[1] Numbers within parentheses indicate the number of cultivated species and/or escapes from cultivation.

have been included with almost full citation of their collectors and places of collection and deposition.

RESULTS

The Malvaceae have a moderate representation in the Jammu and Kashmir State, but only a few species are indigenous. Altogether, 41 species in 15 genera are recorded in this study. Out of these, 12 species are cultivated, with at least half of them escaped from cultivation. Among the escaped cultivated species, *Sidalcea neomexicana*, *Alcea lavateriflora*, *A. pallida*, and *Malva verticillata* var. *rafiqii* are reported for the first time from India. Turning to wild species, *Malva bucharica* and *Althaea broussonetiifolia* are first recorded for the Indian subcontinent; *Malva microcarpa*, *M. ambigua*, and *M. mohileviensis* are new records for India; and *Hibiscus micranthus* is a first record for the Jammu and Kashmir State.

Twenty-seven of the 41 species occur in Jammu Province, 21 in Kashmir, and six in Ladakh. Twelve of the 15 genera occur in Jammu, nine in Kashmir, and only one (*Malva*) in Ladakh. It is evident that there is a marked decline in the number of genera and species as one proceeds from the sub-Himalayan Jammu through the Himalayan Kashmir to the trans-Himalayan Ladakh (Table 1). The number of species in common is highest between Jammu and Kashmir, while it is the lowest between Jammu and Ladakh. Almost all our arborescent species are restricted to Jammu, although *Hibiscus syriacus* is commonly grown ornamentally in Kashmir. None of our taxa except *Lavatera kashmiriana* and a few species of *Malva* reach subalpine and alpine ranges.

None of the taxa recorded here is endemic to the Jammu and Kashmir State. All our genera except *Sidalcea* (a North American plant, collected as an escape from cultivation only once in Kashmir) are shared with Pakistan. As for our other neighboring countries, *Fioria* does not occur in Afghanistan, U.S.S.R., China, and Iran; *Kydia* and *Thespesia* are absent from Afghanistan, U.S.S.R., and Iran; *Malva* and *Lavatera* are not found in Burma; *Sida* is unknown from Afghanistan; *Malvastrum* is unknown from Afghanistan, U.S.S.R., and Burma; and *Urena* does not occur in Afghanistan, U.S.S.R., and Iran. Almost all our species (38) are also in Pakistan, followed by 22 in Iran, 19 each in the U.S.S.R. and China, 11 in Burma, and 10 in Afghanistan. Both our new records for the Indian subcontinent (*Malva bucharica* and *Althaea broussonetiifolia*) grow in the U.S.S.R.

MALVACEAE A. L. DE JUSSIEU, GEN. PL. 271. 1789.

Plants annual, biennial, or perennial herbs, to small trees, mucilaginous, usually pubescent with stellate, furcate, and simple hairs, rarely with fer-

ruginous peltate scales. Leaves alternate, simple, stipulate, petiolate, unlobed to deeply lobed. Flowers axillary, solitary, or fasciculate, or subracemose to paniculate, usually bracteate with an epicalyx of 3–13 free or basally connate segments, sometimes ebracteate, actinomorphic, usually perfect, sometimes polygamodioecious. Calyx usually campanulate or tubular, 5-lobed or -toothed, rarely spathaceous and 2- or 3-lobed, valvate, usually persistent. Corolla polypetalous, 5-merous, adnate basally to the staminal tube, contorted. Stamens numerous, monadelphous with filaments coherent to form a staminal tube, this wholly or partially antheriferous; anthers dorsifixed, monothecous, linear to horseshoe-shaped, solitary, rarely in clusters of 3–5. Carpels (3–)5–many, syncarpous in a single whorl (in ours) around the columella; ovary superior, with as many locules as carpels; placentation axile; style usually divided at the apex into as many (or twice as many) branches as carpels, or sometimes unbranched; stigmas sessile, linear or capitate or discoid. Fruit a dry, loculicidal (or indehiscent) capsule or a schizocarp separating into usually 1-seeded mericarps, rarely follicular and 2–3-seeded. Seeds reniform, ovoid or obovoid, glabrous or pubescent with short and long hairs.

Considerable embryological work has been done on this family (Schnarf, 1931; Venkata Rao, 1954, 1955; Winter, 1960; Ramchandani et al., 1966), and optimistic views are being held about the taxonomic significance of such studies. The structure and development of the seed and seed coat anatomy have also been shown to be of great taxonomic and phylogenetic value (Reeves, 1936; Wunderlich, 1967; Bouman, 1971; Mohana Rao, 1978; Kumar, 1981).

A family of 88 genera and ca. 2,300 species, most abundant in the tropics, common in subtropical and temperate regions, and usually absent from arctic regions. The Ureneae have style branches and stigmas twice as many as the carpels. The Malopeae have carpels irregularly arranged in two or more whorls around the carpophore and the style branches and stigmas are as many as carpels; the fruit is schizocarpic. In the Hibisceae the carpels are regularly arranged in a single whorl around the carpophore, the style branches and stigmas are as many as carpels or the style is unbranched, and the fruit is capsular. The Malopeae do not occur in our area. The Malveae are represented here by *Malva*, *Lavatera*, *Alcea*, *Althaea*, *Abutilon*, *Sida*, *Malvastrum*, and *Sidalcea*; the Hibisceae by *Fioria*, *Hibiscus*, *Abelmoschus*, *Kydia*, *Gossypium*, and *Thespesia*; and the Ureneae by *Urena*.

Key to the Genera of Malvaceae in Jammu and Kashmir State

1a. Flowers polygamous or polygamodioecious.
  2a. Plants trees; flowers white, polygamous; epicalyx present; anthers in globose head of 3–5; carpels not beaked ..... 4. *Kydia*
  2b. Plants herbs; flowers rose-purple, polygamodioecious; epicalyx absent; anthers solitary; carpels beaked ..... 15. *Sidalcea*

1b. Flowers bisexual.
  3a. Style branches and stigmas twice the number of carpels, always 10; mericarps glochidiate-spiny ..... 14. *Urena*
  3b. Style branches and stigmas as many as carpels or style unbranched; mericarps never glochidiate-spiny.
    4a. Fruit a capsule, the carpels at maturity not separating from one another.
      5a. Style unbranched, ± clavate, or superficially divided into very short branches.
        6a. Plants herbaceous to suffrutescent, not covered with ferruginous peltate scales; leaves lobed; epicalyx segments cordate, foliaceous, persistent; calyx with oil glands; capsule fibrous, loculicidally dehiscent ..... 5. *Gossypium*
        6b. Plants small trees, herbaceous portions covered with ferruginous peltate scales; leaves unlobed; epicalyx segments lanceolate, not foliaceous, caducous; calyx without oil glands; capsule ± woody, indehiscent ..... 6. *Thespesia*
      5b. Style divided into 5 divergent branches.
        7a. Calyx spathaceous, irregularly 2- or 3-lobed, falling together with corolla and staminal tube ..... 3. *Abelmoschus*
        7b. Calyx usually campanulate, regularly 5-lobed, persistent, not falling as a unit with corolla and staminal tube.
          8a. Capsule with 5 conspicuous, scarious, and strongly veined wings ..... 1. *Fioria*
          8b. Capsule not winged ..... 2. *Hibiscus*
    4b. Fruit a schizocarp, the carpels at maturity (mericarps) separating from one another leaving a distinct central columella.
      9a. Epicalyx present.
        10a. Epicalyx segments 3; staminal tube antheriferous only in the apical part.
          11a. Leaves ovate to lanceolate-oblong, unlobed; flowers yellow; stigmas capitate; mericarps tricuspidate (in ours) ..... 13. *Malvastrum*

11b. Leaves orbicular-reniform or cordate, mostly lobed or angled; flowers pink-lilac (or white); stigmas linear, decurrent; mericarps awnless.
12a. Stipules foliaceous; epicalyx segments ovate-orbicular, foliaceous, connate at base; mericarps 20–25; style base enlarged in fruit ..... 10. *Lavatera*
12b. Stipules not foliaceous; epicalyx segments linear or oblong-ovate, not foliaceous, free; mericarps 8–15; style base not enlarged in fruit ..... 7. *Malva*
10b. Epicalyx segments 6–12; staminal tube antheriferous almost to the base.
13a. Epicalyx segments 7–12; corolla 2–3 cm in diameter, 0.8–2.2 cm long; staminal tube cylindrical, the anthers brownish purple; mericarps 12–25, unilocular, wingless ..... 8. *Althaea*
13b. Epicalyx segments 6–7; corolla 5–8 cm in diameter, 3.5–7 cm long; staminal tube 5-angled, the anthers yellowish; mericarps 20–40, sub-bilocular, often winged ..... 9. *Alcea*
9b. Epicalyx absent.
14a. Calyx cupular; mericarps 10–20, follicular, 2–3-seeded ..... 11. *Abutilon*
14b. Calyx campanulate; mericarps 5–10, not follicular, 1-seeded ..... 12. *Sida*

1. FIORIA Mattei, Boll. Reale Orto Bot. Giardino Color. Palermo 2: 71. 1916.

Four species, distributed in tropics and subtropics of the Old World; represented in our area by a single species.

Fioria vitifolia (L.) Mattei, Boll. Reale Orto Bot. Giardino Color. Palermo 2: 71. 1916. *Hibiscus vitifolius* L., Sp. Pl. 696. 1753; Masters in Hook. f., Fl. Brit. India 1: 333. 1874; Rakshit & Kundu, Bull. Bot. Surv. India 12: 166. 1970; Ngwe, Union Burma J. Life Sci. 4: 204. 1971; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 480. 1972; Sharma & Kachroo, Fl. Jammu 1: 112. 1981. *H. vitifolius* L. var. *genuinus* Hochr., in Annuaire Conserv. Jard. Bot. Genève 4: 169. 1900. TYPE: Herb. Hermann, Vol. IV, Fol. 39, *Linn. no. 265* (lectotype, BM); see Brenan & Exell, Bol. Soc. Brot. Ser. 2. 32: 72. 1958.

Hibiscus obtusifolius Willd., Sp. Pl. 3: 829. 1801.
H. truncatus Roxb., Hort. Bengal. 51. 1814; Fl. Ind. ed. 1832. 3: 200. 1832.
H. cuspidatus Edgew., J. Asiat. Soc. Bengal 21: 168. 1853.
Fioria vitifolia (L.) Mattei subsp. *vulgaris* (Brenan & Exell) Abedin, Pakistan J. Bot. 9: 59–66. 1977; Fl. W. Pak. 130: 5. 1979. *Hibiscus vitifolius* L. subsp. *vulgaris* Brenan & Exell, Bol. Soc. Brot. ser. 2. 32: 73. 1958.
H. heterotrichus DC., Prodr. 1: 450. 1824. *H. vitifolius* L. var. *heterotrichus* (DC.) Hochr., Annuaire Conserv. Jard. Bot. Genève 4: 170. 1900.

Annual, suffrutescent herbs. Stems and inflorescence axes usually densely tomentose with stellate and glandular hairs. Leaves ovate-cordate, entire or shallowly 3–5-lobed, coarsely serrate, stellately tomentose beneath or on both surfaces. Flowers axillary, solitary or clustered at the ends of branches, usually drooping; pedicels shorter than petioles, articulate at or below the middle. Epicalyx of 7–12 linear segments. Calyx campanulate, 5-lobed; lobes ovate, acute, 3–5-nerved, simple and 2-rayed pubescent within, stellate-tomentose outside. Corolla twisted, 3–5 cm diam., yellow with a purple center; petals obovate, glabrescent. Staminal tube truncate, shorter than corolla, antheriferous throughout. Capsule suborbicular, apiculate, 5-winged, hirsute. Seeds 2–4 in each cell, reniform, minutely tubercled.

Distribution. India, Pakistan, Burma, Sri Lanka, Australia, and tropical Africa. In our area it occurs in Jammu Province only. Sharma & Kachroo (1981: 113) wrongly reported it as a new record for Jammu and Kashmir.

Additional specimens examined. INDIA. JAMMU: Mandal, common along banks of irrigation channels, *B. M. Sharma 765* (KASH); Poonch Dist. Nawal Nadi, *A. Rashid s.n.* (RAW); Rajouri, *Jacquemont 1428* (fide Stewart, 1972: 480).

Abedin (1979) followed Brenan & Exell (Bol. Soc. Brot. Ser. 2. 32: 73. 1958) in placing the specimens of *Fioria vitifolia* from Pakistan and Kashmir under subsp. *vulgaris*, which is said to differ from subsp. *vitifolia* in the density of indumentum and leaf incision. However, the depth of leaf incision, the shape of the leaf lobes, and the density and rigidity of hairs have been found to be highly variable in the species, even within a single plant (Rakshit & Kindu, 1970). Subdivision of the species on the basis of the above-mentioned characters does not, therefore, seem to be satisfactory.

Most previous authors included *Fioria* in *Hibiscus*. This seems almost justified, especially when we consider their only superficial differentiating character of winged (*Fioria*) and nonwinged (*Hibiscus*) capsule. However, for a better understanding of these plants, it is now believed to recognize the two as distinct genera.

2. HIBISCUS L., Sp. Pl. 693. 1753; Gen. Pl. 5th Edition. 310. 1754.

Ketmia Miller, Gard. Dict. Abr. 4th Edition. 28. 1754.
Pariti Adans., Fam. Pl. 2: 401. 1763.
Paritium Adr. Juss. in St. Hilaire, Fl. Bras. Mered. 1(2): 255. 1827.

A genus of some 3,000 species distributed chiefly in the tropical and subtropical regions of both hemispheres. Six species occur in our area, of which two are cultivated.

KEY TO THE SPECIES OF *HIBISCUS* IN JAMMU AND KASHMIR STATE

1a. Flowers drooping; petals deeply laciniate; staminal tube much longer than corolla, exserted ..... 2. *H. schizopetalus*
1b. Flowers not drooping; petals usually entire; staminal tube shorter than or equaling the corolla, included.
  2a. Epicalyx absent or rarely represented by minute teeth ..... 5. *H. lobatus*
  2b. Epicalyx present, represented by conspicuous segments.
    3a. Epicalyx segments radiate; staminal tube antheriferous in the upper half only ..... 6. *H. caesius*
    3b. Epicalyx segments not radiate; staminal tube antheriferous throughout.
      4a. Annual herbs; calyx inflated, more so in fruit; seeds glabrous ..... 1. *H. trionum*
      4b. Shrubs; calyx not inflated; seeds villous or with a line of long white hairs.
        5a. Plants usually glabrous; leaves elliptic-rhombic, often 3-lobed; pedicels equal to or shorter than petioles; flowers 4–6 cm in diameter; seeds with a line of long white hairs ..... 3. *H. syriacus*
        5b. Plants scabrous-bristly; leaves ± ovate, unlobed; pedicels longer than petioles; flowers 1–1.5 cm in diameter; seeds villous ..... 4. *H. micranthus*

1. Hibiscus trionum L., Sp. Pl. 697. 1753; Masters in Hook. f., Fl. Brit. India 1: 334. 1874; Iljin in Shishkin & Bobrov, Fl. U.R.S.S. 15: 159. 1949; Hu, Fl. China, Malvaceae. 57. 1955; Rakshit & Kundu, Bull. Bot. Surv. India. 168. 1970; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 480. 1972; Riedl in K. H. Rechinger, Fl. Iran. 120: 30. 1976; Singh & Kachroo, Forest Fl. Srinagar. 151. 1976; Abedin in Nasir & Ali, Fl. W. Pak. 1300. 11. 1979. TYPE: *Linn. Herb. no. 875/39*, photo (LINN).

Hibiscus africanus et *H. hispidus* Miller, Gard. Dict. 8th Edition. HIB. 1768.
H. vesicarius Cav., Diss. 3: 171, tab. 64, f. 2. 1787.
H. dissectus Wallich, Cat. no. 3696. 1831, nom. nud.

Annual hispid herbs. Stems with simple and tuberculate-stellate hairs. Leaves orbicular-ovate, the lower leaves usually undivided, the upper leaves palmately 3–5-lobed, the lobes obovate or oblong, pinnatisect, punctate, nearly glabrous or sparsely stellate-pubescent, especially abaxially. Flowers solitary, axillary; pedicels longer than petioles, articulate above the middle. Epicalyx of 8–13 linear, long-hispid segments. Calyx campanulate, 5-lobed, inflated in fruit; lobes deltoid, acute, membranous; with many hispid, green-purplish, raised veins. Corolla 1.5–3 cm diam., pale yellow with a dark purple center; lobes glabrous. Staminal tube shorter than corolla, purplish, antheriferous throughout. Capsule oblong, obtuse, strigose-hispid, black, enclosed in the inflated persistent calyx. Seeds ± reniform, tuberculate-rugose when mature, glabrous.

Distribution. India, Pakistan, Afghanistan, southern U.S.S.R., Burma, China, Iraq, Iran, Turcomania, Transcaucasia, Mediterranean Region, southern Europe to southern Africa, Australia; naturalized in America. In our area it is common in Kashmir Province, often growing as a weed escaped from cultivation. Stewart (1972) gives Poonch, Jammu.

Specimens examined. INDIA. KASHMIR: university campus, *A. R. Naqshi 195* (KASH); Gulmarg, *A. R. Naqshi 514* (KASH); Kokernag, *I. M. Nahvi s.n.* (KASH); Anantnag, collector not known, *s.n.* (KASH); Srinagar, *G. N. Javeid 360* (KASH); Dachigam, *G. Singh 888* (KASH); Ganderbal, *G. H. Dar 3004* (KASH); Shuhama (Ganderbal), *G. H. Dar 2943–44* (KASH), *2942* (PF); Sarich (Ganderbal), *G. H. Dar 1767–68* (KASH); Narbal, *A. R. Naqshi & G. N. Dar 8173–75* (KASH).

This is a species of the eastern Mediterranean Region, now widespread in almost all the continents. Despite the extensive distribution, the species retains its essential morphological characters throughout. However, a number of species related to it have been described. Hochreutiner (1900) retained *H. trionum* s. str. and reduced to varieties some species described by earlier workers. We follow this conservative approach.

A diaphoretic syrup is prepared from its leaves, which contain 0.3% rubber substances. The seeds contain 23.8% oil. In South Africa the plant is said to be used for treatment of round worm, while in

China and Malaya the dried leaves are considered stomachic. An infusion of the flowers is used for itch, for painful skin diseases, and as a diuretic. It is reported to be poisonous to stock, particularly horses.

2. Hibiscus schizopetalus (Masters) Hook. f., Bot. Mag. 106, tab. 6524. 1880; Hu, Fl. China, Malvaceae. 46. 1955; Rakshit & Kundu, Bull. Bot. Surv. India 12: 166. 1970; Ngwe, Union Burma J. Life Sci. 4: 205. 1971; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 479. 1972; Abedin in Nasir & Ali, Fl. W. Pak. 130: 12. 1979. *Hibiscus rosa-sinensis* L. var. *schizopetalus* Masters, Gard. Chron. n.s. 12: 272, f. 45. 1879. TYPE: Gard. Chron. n.s. 12: 272, f. 45. 1879.

Glabrous shrubs with spreading-drooping branches. Leaves elliptic, glabrous, shining, palmately nerved, entire in basal half, serrate in apical half. Flowers solitary, axillary, pendulous; pedicels slender, longer than petioles, articulate at the middle. Epicalyx of 5–8 subulate, ciliate segments 1–2 mm long. Calyx spathaceous, tubular, irregularly 2–5-lobed. Corolla 4–9 cm diam., pinkish; petals deeply laciniate and recurved. Staminal tube much longer than corolla, filiform, pendulous, red, antheriferous in the upper half only. Capsule oblong-cylindrical. Seeds smooth, glabrous.

Distribution. Native of Kenya and Tanganyika (Exell, Fl. Zambes. 1: 470. 1960), cultivated elsewhere. It is commonly cultivated in gardens throughout India, Pakistan, Burma, and a few coastal cities in southern China. In our area it is rarely grown, collected only at Banihal in Jammu Province.

Specimen examined. INDIA. JAMMU: Banihal, *Sirajud-din s.n.* (KASH).

It is reported that the flowers in *H. schizopetalus* drop after anthesis and that fruits seldom form. According to Wilcox & Holf (Hawaii Agr. Exp. Sta. Bull. 29. 1913) it has been used as "male" parent in crosses with *H. rosa-sinensis* L. and its varieties. In 1984 Fryxell labeled the specimen cited above as "apparently a hybrid or a hybrid-derivative of *Hibiscus rosa-sinensis* L. and *H. schizopetalus* (Masters) Hooker."

3. Hibiscus syriacus L., Sp. Pl. 695. 1753; Masters in Hook. f., Fl. Brit. India 1: 344. 1874; Iljin in Shishkin & Bobrov, Fl. U.R.S.S. 15: 152.1949; Hu, Fl. China, Malvaceae. 50. 1955; Kitamura, Fl. Afghan. 270. 1960; Rakshit & Kundu, Bull. Bot. Surv. India 12: 170. 1970; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 480. 1972; Riedl in K. H. Rechinger, Fl. Iran. 120: 29. 1976; Abedin in Nasir & Ali, Fl. W. Pak. 130: 13. 1979. TYPE: Syria: *Linn. Herb. no. 875/24* (LINN).

Ketmia syriaca Scop., Fl. Carniol. 2nd Edition. 2: 45. 1772.
K. syrorum Medikus, Malvaceae: 45. 1787.
K. arborea Moench, Suppl. Meth. 617. 1794.
Hibiscus floridus Salisb., Prodr. 383. 1796.
H. acerifolius Salisb., Parad. Londin. 1: tab. 33. 1805.
H. syriacus L. var. *sinensis* Lemaire, Jard. Fleur. 4: tab. 370. 1854.
H. chinensis sensu Forbes & Hemsley, J. Linn. Soc., Bot. 23: 88. 1886.

Glabrous, branched shrubs. Leaves elliptic-rhombic, acute at the apex, cuneate at the base, irregularly dentate, often 3-lobed. Flowers solitary, axillary, single or double; pedicels equaling or shorter than petioles. Epicalyx of 6–8 linear, single-nerved segments. Calyx campanulate, densely stellate-tomentose, shallowly 5-lobed; lobes triangular-lanceolate, acute. Corolla campanulate, 4–6 cm diam., usually lilac with a purple center; petals obovate, ciliate and stellately villose outside. Staminal tube shorter than corolla, antheriferous to the base. Capsule oblong-ellipsoid, yellowish, stellate-tomentose, shortly beaked at the apex. Seeds reniform, glabrous except for a line of long white hairs.

Distribution. China, cultivated elsewhere. Grown in gardens throughout India, Pakistan, Afghanistan, China, Iran, and other countries. In our area this species is extensively grown as an ornamental shrub or as a hedge plant in the Kashmir Valley.

Additional specimens examined. INDIA. KASHMIR: Beehama (Ganderbal), *G. H. Dar 2866* (KASH), *2866a* (PF); Srinagar University campus, *A. R. Naqshi 8176* (KASH); Nehru Bot. Garden (Cheshma Shahi), *A. R. Naqshi s.n.* (KASH).

A number of single and double horticultural varieties of this species have been described mainly on the basis of flower color, which ranges from purple-pink through pink to pure white. Hu (1955) recognized nine varieties mainly on the basis of floral size and color.

Although the plant is mainly used ornamentally, its stem is said to yield a strong fiber. The seeds contain 24.6% oil. In China, the flowers are re-

portedly eaten, and the tender leaves are used as a substitute for tea and as a shampoo.

4. Hibiscus micranthus L. f., Suppl. Pl. 308. 1781; Masters in Hook. f., Fl. Brit. India 1: 335. 1874; Rakshit & Kundu, Bull. Bot. Surv. India 12: 171. 1970; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 479. 1972. *Hibiscus micranthus* L. f. var. *genuinus* Hochr., Annuaire Conserv. Jard. Bot. Genève 4: 83. 1900. TYPE: *Linn. Herb. no. 875/2* (holotype, LINN).

H. gossypinus DC., Prodr. 1: 453. 1824, non Thunberg, 1800.

Erect shrubs with slender, terete branches, scabrid with scattered stellate bristles on almost all parts. Leaves ± ovate, 1.9–4.5 × 1.5–4 cm, acute or obtuse, serrate, eglandular. Flowers axillary, solitary; pedicels slender, longer than petioles, articulate above or below the middle. Epicalyx of 6–8 filiform, stiff, pubescent segments. Calyx 5-lobed; lobes triangular-lanceolate, pubescent. Corolla 1–1.5 cm diam., white or pink; petals often reflexed, stellately pubescent outside. Staminal tube to 5 mm long, shorter than corolla, antheriferous throughout. Capsule globose. Seeds reniform, black, villous.

Distribution. India, Sri Lanka, Pakistan, tropical Africa, South Africa, Madagascar, Arabia. In our area confined to Jammu Province.

Additional specimens examined. INDIA. JAMMU: Ram Nagar forest, common among hedges and on open roadside slopes; erect pubescent shrubs up to six feet tall with rosy-red flowers, *B. M. Sharma 249* (KASH).

Three varieties of *H. micranthus* are recognized from India and Pakistan (Abedin, 1979), but only var. *micranthus* occurs in our area.

The plant is reportedly valued as a febrifuge in Sri Lanka. This is the first record for Jammu and Kashmir State.

5. Hibiscus lobatus (Murray) Kuntze, Revis. Gen. Pl. 3rd Edition. 2: 19. 1898; Rakshit & Kundu, Bull. Bot. Surv. India 12: 169. 1970; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 479. 1972; Abedin in Nasir & Ali, Fl. W. Pak. 130: 18. 1979; Sharma & Kachroo, Fl. Jammu 1: 112. 1981. *Solandra lobata* Murray, Comment. Soc. Regiae. Sci. Gott. 6: 20, tab. 1. 1785. TYPE: Comment. Soc. Regiae. Sci. Gott. 6: 20, tab. 1.

Hibiscus solandra L'Hér., Stirp. Nov. 1: 103, tab. 49. 1789, nom. illeg.; Masters in Hook. f., Fl. Brit. India 1: 336. 1874. *H. solandra* var. *genuinus* Hochr., Annuaire Conserv. Jard. Bot. Genève 4: 128. 1900.

H. pumilis Roxb., Fl. Ind. 3: 203. 1832.

Lagunea lobata Willd., Sp. Pl. 4th Edition. 3: 733. 1800.

L. sinuata Hornem., Hort. Bot. Hafn. 2: 645. 1851.

Annual, erect, pubescent or somewhat hispid herbs. Leaves polymorphic, the lower leaves orbicular-ovate, the upper leaves deeply 3-lobed, the uppermost 3-fid, all cordate, crenate or coarsely serrate, pubescent with simple and stellate hairs on both surfaces. Flowers solitary and axillary, or in terminal racemes; pedicels equal to or longer than petioles, articulate near the apex. Epicalyx segments absent or rarely represented by minute teeth. Calyx 5-lobed, pubescent without; lobes lanceolate, prominently 3-nerved. Corolla 1–2 cm diam.; white to pale yellow; petals obliquely obcordate. Staminal tube shorter than or equaling corolla, pink, antheriferous throughout. Capsule ovoid, beaked, ± wrinkled and pubescent. Seeds ± reniform, black, usually granulated, minutely pubescent.

Distribution. India, Pakistan, Sri Lanka, Laccadive Islands, tropical Africa, Madagascar, and Java. In our area confined to Jammu Province.

Specimen examined. INDIA. JAMMU: Ram Nagar, common under shade on roadside slopes, often associated with *Triumfetta rhomboidea* Jacquem., *Bidens bipinnata* L., and other annuals; erect herbs up to 2 feet tall, flowers white with sticky calyx, *B. M. Sharma 204* (KASH).

6. Hibiscus caesius Garcke, Bot. Zeit. 7: 850. 1849; Rakshit & Kundu, Bull. Bot. Surv. India 12: 173. 1970; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 478. 1972; Abedin in Nasir & Ali, Fl. W. Pak. 130: 21. 1979. *H. caesius* Garcke var. *genuinus* Hochr., Annuaire Conserv. Jard. Bot. Genève 4: 160. 1900.

Hibiscus pentaphyllus F. Muell., Fragm. 2: 13. 1859, non Roxb., 1832.

H. gibsonii Stocks ex Harvey, Fl. Cap. 2: 587. 1859–1860; Masters in Hook. f., Fl. Brit. India 1: 339. 1874.

H. heptaphyllus Dalz. & A. Gibson, Bombay Fl. 20. 1861.

Erect, usually suffrutescent herbs; branches bristly or with minute bristle-pointed prickles. Leaves palmately 3–5-lobed, the lobes oblong-elliptic, sharply serrate, glabrous or stellately pubescent. Flowers solitary, axillary; pedicels longer than leaves, articulate near the apex. Epicalyx of usually 10 radiate, needlelike, subspiny segments. Calyx 5-lobed, the lobes lanceolate, acuminate, strongly

3-nerved, distantly ciliate. Corolla 3–5 cm diam., yellow with purple center or completely purple, rarely white with purple center; petals obovate, sparsely stellate-pubescent outside. Staminal tube shorter than corolla, purple, antheriferous in upper half only. Capsule ovoid, beaked; valves setose. Seeds dark brown, pilose.

Distribution. India, Pakistan, Afghanistan, south tropical Africa and north Australia. Rare in our area, reported from the Pakistan-occupied part of Poonch District in Jammu Province.

Specimen examined. INDIA. JAMMU: Poonch Mirpur, in bushes, *Stewart 27244* (RAW).

One more species, *Hibiscus hirtus* L. is reported from Kashmir by Stokoe (fide Stewart, 1972) and probably is based on misidentification and remains yet to be seen. The specimen *B. M. Sharma 249* (KASH) under this name turned out to be *H. micranthus*.

3. ABELMOSCHUS Medikus, Malvaceae 45. 1787; Schumann, Nat. Pflanzenfam. III. 6: 49. 1890; Hochr., Candollea 2: 83. 1924; Taxon 4: 188. 1955.

Laguna Cav., Diss. 3: 173. 1787.
Bamia R. Br. ex Wallich, Pl. Asiat. Rar. 1: 39. 1830.

Six species (Borssum-Waalkes, 1966), distributed in temperate and warm regions. Three species have been recorded form our state, one cultivated.

KEY TO THE SPECIES OF *ABELMOSCHUS* IN JAMMU AND KASHMIR STATE

1a. Epicalyx segments caducous before anthesis; corolla white (turning pinkish at maturity), with a dark purple center ..... 2. *A. ficulneus*
1b. Epicalyx segments persisting until dehiscence of fruit; corolla yellow to yellowish white, with a purple center.
  2a. Epicalyx segments 7–12, linear to narrowly lanceolate, 1–2.5 mm wide; corolla 5–7 cm diam.; capsule cylindrical, 7–25 cm long; seeds glabrous ..... 1. *A. esculentus*
  2b. Epicalyx segments 4–5, ovate-lanceolate, 5–10 mm wide; corolla 7–10 cm diam.; capsule ovate-ellipsoid, 3.5–6 cm long; seeds glabrescent ..... 3. *A. pungens*

1. Abelmoschus esculentus (L.) Moench, Methodus 617. 1794; Hu, Fl. China, Malvaceae. 39. 1955; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 475. 1972; Abedin in Nasir & Ali, Fl. W. Pak. 130: 25. 1979. *Hibiscus esculentus* L., Sp. Pl. 696. 1753; Masters in Hook. f., Fl. Brit. India 1: 343. 1874; Iljin in Shishkin & Bobrov, Fl. U.R.S.S. 15: 165. 1949; Ngwe, Union Burma J. Life Sci. 4: 203. 1971; Riedl in K. H. Rechinger, Fl. Iran. 120: 32. 1976. TYPE: "Habitat in Indiis," *Linn. Herb. no. 875/31* (LINN).

Hibiscus ficifolius Miller, Gard. Dict. 8th Edition. 15. 1768.
H. longifolius Willd., Sp. Pl. 4th Edition. 3: 827. 1800.

Annual, erect herbs, strigose-hirsute throughout. Leaves aceriform, wider than long, cordate, angular or palmately 3–7-lobed; lobes ovate to lanceolate, dentate. Flowers solitary and axillary. Epicalyx segments 7–12, linear to narrowly lanceolate, persisting until dehiscence of fruit. Calyx 5-toothed, spathaceous, bilabiate, caducous. Corolla 5–7 cm diam., yellow to yellowish white with a purple center; petals obovate. Staminal tube 2–2.5 cm long, included, antheriferous throughout. Capsule cylindrical, 7–25 cm long, 5-angled, acuminate, strigose-hirsute. Seeds ± globose, glabrous.

Distribution. Cultivated as vegetable in most tropical and many temperate countries; also in the Jammu and Kashmir provinces, known there as "Bhindi."

Additional specimen examined. INDIA. KASHMIR: Chatterhama (Srinagar), 1,700 m, *G. H. Dar 8963–66* (KASH).

According to Abedin (1979), the species is Asian in origin, as the whole genus is mainly of Asiatic distribution. On the basis of its close resemblance to *A. tuberculatus* Pal & Singh, a northern Indian species, Borssum-Waalkes (1966) considered the latter as one of the possible ancestors. This is taken to imply that *A. esculentus* originated in India (Hu, 1955 and Abedin, 1979). Babu (1977), however, thought it originated in Africa.

The species is primarily cultivated for the young fruits, which are eaten fresh or cooked as vegetables. Chopped capsules are used in making mucilaginous soups and sauces. Roasted seeds are also edible and are used as a substitute for coffee. The seeds contain 18% oil and ca. 15% water-soluble proteins. The plant is used in medicine for its diuretic and anticatarrhal effects. The stems furnish fiber and serve as raw material for paper production.

2. Abelmoschus ficulneus (L.) Wight & Arn. ex Wight, Cat. 14. 1833; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 475. 1972; Abedin in Nasir & Ali, Fl. W. Pak. 130: 26. 1979. *Hibiscus ficulneus* L., Sp. Pl. 695. 1753; Masters in Hook. f., Fl.

Brit. India 1: 340. 1874; Ngwe, Union Burma J. Life Sci. 4: 204. 1971. TYPE: Dillenius, Hort. Elth., tab. 157, f. 190.

Laguna aculeata Cav., Diss. 3: 173, tab. 71, f. l. 1783. *Hibiscus sinuatus* Cav., Diss. 3: 147, tab. 52, f. 2. 1787. *Abelmoschus alboruber* F. Muell., Fragm. 1: 67. 1859.

Annual, sometimes prickly herbs. Leaves orbicular with cordate base and serrate margin, palmately 3–5-parted, scabrous on both surfaces; lobes obovate to spathulate. Flowers solitary, axillary or in terminal racemes. Epicalyx segments 5–6, lanceolate, falling before expansion of corolla. Calyx 5-toothed, spathaceous, rarely bilabiate, tomentose, caducous. Corolla 3–6 cm diam., white, turning pinkish at maturity, with a dark purple center; petals obovate. Staminal tube ca. 1.5 cm long, included, wholly antheriferous. Capsule pyramidal-ovoid, 3–4 cm long, 5-angled, hispid. Seeds ovoid to clavate-globose, black, striated with pilose stellate hairs.

Distribution. Northern Australia, southern Asia, Malaysia, eastern Africa, and Madagascar. Very rare in our area, this species has been collected from Jammu only (Stewart, 1972: 475).

3. Abelmoschus pungens (Roxb.) Voigt, Hort. Calc. 119. 1845; Abedin in Nasir & Ali, Fl. W. Pak. 130: 27. 1979. *Hibiscus pungens* Roxb., Hort. Bengal. 52. 1814, nom. nud., Fl. Ind. ed. 1832. 3: 213. 1832; Masters in Hook. f., Fl. Brit. India 1: 341. 1874. *Hibiscus manihot* L. var. *pungens* (Roxb.) Hochr., Annuaire Conserv. Jard. Bot. Genève 4: 155. 1900. *Abelmoschus manihot* (L.) Medicus, var. *pungens* (Roxb.) Hochr., Candollea 2: 87. 1924. *A. manihot* var. *pungens* (Roxb.) Hochr. sensu Hu, Fl. China, Malvaceae. 36. 1955. TYPE: Roxburgh's Icone *no. 1585* (K).

Annual or perennial herbs, densely covered with long, yellow, bristly hairs. Leaves orbicular to broadly ovate, cordate at base, palmately 3–7-lobed or -parted; lobes variable, ovate to lanceolate, oblong-lanceolate, obovate or elliptic, entire to coarsely serrate. Flowers solitary, axillary, sometimes subracemose towards the stem apex. Epicalyx segments 4–5, ovate-lanceolate, persisting until dehiscence of fruit. Calyx 5-toothed, spathaceous, caducous. Corolla 7–10 cm diam., yellow with a purple center; petals usually obovate. Staminal tube 1.5–3 cm long, included, antheriferous to base. Capsule ovate-ellipsoid, 3.5–6 cm long, 5-angular, short-beaked. Seeds globular or reniform, black, scabrid on the back, glabrescent.

Distribution. Northern India, Pakistan (rare), China, Malaysia, Philippines, and northern Australia. In our area this species has been collected only in the Pakistan-occupied part of Poonch District in Jammu Province and is no doubt very rare.

Specimen examined. INDIA. JAMMU: Poonch District, Nawal Nadi, 11-9-1953, *A. Rashid, E. Nasir & R. R. Stewart s.n.* (RAW).

According to Hu (1955), this species is found wild in China and northern India on grassy banks or along roadsides at altitudes of 1,500–1,600 m. She further reported that this plant (like her *Abelmoschus manihot* "typicus") is extensively cultivated in China for its flowers and roots. The flowers are said to be used in soup for the conservation of health during hot summer months. The root may be used fresh or dried. It is boiled with pork, and the preparation taken internally to cure abscesses. It is also soaked in rape seed oil and used for dressing boils.

The genus *Abelmoschus* was established by Medicus (1787) to accommodate species of *Hibiscus* with caducous calyces. The new genus was subsequently adopted by Gaertner (1791) and Moench (1794). Notwithstanding this, most workers on the Indian flora (Roxburgh, 1832; Masters, 1874; Prain, 1903; Duthie, 1903; Gamble, 1957; Cooke, 1958; and others) did not recognize the new genus but considered *Abelmoschus* as a section of *Hibiscus*. Hochreutiner (1924), however, stressed the need of placing *Abelmoschus* apart from *Hibiscus*, because in the former the calyx, corolla, and stamens are adnate basally and fall together after anthesis, although earlier (1900) he considered *Abelmoschus* only to be a section of *Hibiscus*. Most recent workers on Malvaceae (Hu, 1955; Borssum-Waalkes, 1966; Abedin, 1979) have treated *Abelmoschus* as a distinct genus. We also take this approach and agree with Paul A. Fryxell (1984, pers. comm.) in believing that the species of *Fioria*, *Abelmoschus*, and *Hibiscus* are better understood when separated into distinct genera.

4. KYDIA Roxb., Pl. Coromandel 3: 11, tab. 215–216. 1819.

Four or five species, distributed in India, Pakistan, Burma, and China; one species recorded from our area.

Kydia calycina Roxb., Pl. Coromandel 3: 11, tab. 215. 1819; Fl. Ind. ed. 1832. 3: 188. 1832; Masters in Hook. f., Fl. Brit. India 1: 348. 1874; Hu, Fl. China, Malvaceae. 71.

1955; Ngwe, Union Burma Life Sci. 4: 200. 1971; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 480. 1972; Abedin in Nasir & Ali, Fl. W. Pak. 130: 28. 1979; Sharma & Kachroo, Fl. Jammu 1: 110. 1981. TYPE: Roxb., Pl. Coromandel 3: 11, tab. 215. 1819.

Kydia fraterna Roxb., Pl. Coromandel 3: 12, tab. 216. 1819.

Medium-sized trees, the herbaceous portions with stellate pubescence. Leaves broadly cordate to suborbicular, entire or usually 3–5-angled, stellate-pubescent, the midrib (sometimes adjacent nerves also) with a basal gland abaxially. Flowers paniculate, polygamous. Epicalyx segments 4–6, oblong, in fruit obovate-spathulate, spreading stellately, densely stellate-villous, 5-parted; lobes triangular, incurved, persistent, ± enclosing fruit. Corolla rotate, connate at base, 1–2 cm diam., white; petals obovate-obcordate, barbate at the base. Staminal tube 3–5 mm long, included, divided in the apical half into 5 branches, each with a cluster of 3–5 sessile anthers, rudimentary in the carpellate flowers. Ovary globose, villous, 3-carpellate; style with 3 terminal branches, each with a peltate stigma, rudimentary in the staminate flowers. Capsule subglobose, loculicidally 3-valved, stellate-pubescent. Seeds reniform, glabrous.

Distribution. India, Pakistan, Burma, and China. In our area this species occurs, uncommonly, in Jammu Province.

Specimens examined. INDIA. JAMMU: Nandni, uncommon, collected from a slope opposite Brig. Atma Singh's Memorial, small tree, bark gray, young shoots and panicles grayish, leaves hoary, flowers white, *B. M. Sharma 728* (KASH); also reported from Mirpur and Billawar by Lambert (1933).

The wood of this species is straight-grained and good for house building. The liber yields fiber, and the leaves are said to be used as an embrocation.

5. GOSSYPIUM L., Sp. Pl. 693. 1753; Gen. Pl. 5th Edition. 309. 1754.

About 40 species distributed in tropical and subtropical regions; two cultivated species are recorded from our area.

KEY TO THE SPECIES OF *GOSSYPIUM* IN JAMMU AND KASHMIR STATE

1a. Perennial suffrutescent herbs; stipules linear; epicalyx segments connate at the base, ± entire, with 3 small teeth at the apex; filaments equal in length ..... 1. *G. arboreum*

1b. Annual herbs; stipules ovate-falcate; epicalyx segments free, laciniate, with 7–9 long and acuminate teeth at the apex; filaments unequal in length, the upper ones longer ..... 2. *G. hirsutum*

1. Gossypium arboreum L., Sp. Pl. 693. 1753; Masters in Hook. f., Fl. Brit. India 1: 347. 1874; Hu, Fl. China, Malvaceae. 62. 1955; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 477. 1972; Abedin in Nasir & Ali, Fl. W. Pak. 130: 30. 1979. TYPE: *Linn. Herb. no. 874/3* (holotype, LINN).

Gossypium rubrum Fôrskal, Fl. Aegypt.-Arab. 125. 1775.

Perennial, pubescent, suffrutescent herbs with purple branches. Leaves ovate to orbicular or subreniform, 5–7-parted; lobes oblong-lanceolate, acute, stellate-pilose adaxially, sparsely villous abaxially; stipules linear, caducous. Flowers solitary, axillary. Epicalyx segments 3, foliaceous, cordate, connate at the base, ± entire, with 3 small teeth at the apex, stellately hirsute and villose on the nerves. Calyx cupular, ± 5-dentate. Corolla pale yellow, usually with a maroon center, sometimes all purplish. Staminal tube included, antheriferous throughout; filaments equal in length. Capsule fibrous, ovoid, beaked, with persistent, accrescent epicalyx and calyx. Seeds densely covered with long and short hairs.

Distribution. Origin uncertain, possibly African; widely cultivated in tropical and subtropical regions of the Old World. According to Hu (1955), it has escaped from cultivation in Hainan and southwestern Sichuan in China. In our area it was occasionally grown in the Kashmir Valley until recently. Vernacular name: "Kapas."

Additional specimen examined. INDIA. KASHMIR: Pampore, 6 June 1970, *G. N. Javeid s.n.* (KASH).

2. Gossypium hirsutum L., Sp. Pl. 2nd Edition. 975. 1763; Prokhanov in Shishkin & Bobrov, Fl. U.R.S.S. 15: 178. 1949; Hu, Fl. China, Malvaceae. 66. 1955; Abedin in Nasir & Ali, Fl. W. Pak. 130: 31. 1979. *Gossypium herbaceum* L. var. *hirsutum* Schumann, Nat. Pflanzenf. III. 6: 51. 1890. TYPE: Miller's description (see Fryxell, 1968: 882).

G. religiosum L., Syst. Nat. 12th Edition. 2: 462. 1767.

Annual, erect, hirsute herbs with green or red-tinged branches. Leaves broadly cordate, ± orbicular, 3(–5)-lobed, upper ones sometimes entire and ovate; lobes triangularly ovate, abruptly acuminate, glabrescent with simple and stellate hairs on both surfaces; stipules ovate-falcate, caducous.

Flowers solitary, axillary. Epicalyx segments as in the preceding species but free and with 7–9 long and acuminate teeth at the apex. Calyx cupular, 5-toothed. Corolla pale yellow. Staminal tube as in the preceding species but filaments unequal in length, the upper ones longer. Capsule fibrous, ovoid, beaked. Seeds thickly covered with white pubescence.

Distribution. A native of Central America, acclimatized from Guatemala northwards to the cotton belt of the southern United States and cultivated in all cotton-growing countries. In our area it was grown in Kashmir Valley until recently. Vernacular name: "Kapas."

Specimen examined. INDIA. KASHMIR: exact locality not given, *M. Y. Khan s.n.* (KASH).

A third species, *Gossypium herbaceum* L., has been reported from the Kashmir Valley by Stewart (1972: 478), but we have not seen any specimens.

It is said that cotton thrives in Kashmir, but the practice of growing it here has now nearly ceased.

The various species of cotton are abundantly cultivated in many countries of the world for their seeds, which are densely covered with short and long hairs, forming the cotton of commerce.

6. THESPESIA Solander ex Correa, Ann. Mus. Natl. Hist. Nat. 9: 290, tab. 8, f. 2. 1807, nom. cons. *Azanza* Alef., Bot. Zeit. 19: 298. 1861.

About 15 species, distributed in tropics of both hemispheres; a single species has been reported from our area.

Thespesia populnea (L.) Solander ex Correa, Ann. Mus. Natl. Hist. Nat. 9: 290, tab. 8, f. 2. 1807; Masters in Hook. f., Fl. Brit. India 1: 345. 1874; Hu, Fl. China, Malvaceae. 69. 1955; Ngwe, Union Burma J. Life Sci. 4: 200. 1971; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 484. 1972; Abedin in Nasir & Ali, Fl. W. Pak. 130: 32. 1979. *Hibiscus populneus* L., Sp. Pl. 694. 1753. *Malvaviscus populneus* (L.) Gaertner, Fruct. Sem. Pl. 2: 253, tab. 135, f. 3. 1791. TYPE: Herb. Herm. Volume V, fol. 208, tab. 258 (lectotype, BM).

Hibiscus bacciferus Forster f., Fl. Ins. Austr. 48. 1786. *Thespesia macrophylla* Blume, Bijdr. 2: 73. 1825.

Medium-sized bushy trees; herbaceous portions covered with ferruginous, peltate scales. Leaves ovate, cordate at base, shortly acuminate, entire; stipules linear-lanceolate, caducous. Flowers solitary, axillary; pedicels 1–5 cm long, articulate at base. Epicalyx segments 3, lanceolate, caducous. Calyx cupular, truncate, minutely 5-toothed, coriaceous, persistent. Corolla convolute, campanulate, pale yellow with a crimson center. Staminal tube cylindric, included, 5-dentate at the apex, antheriferous for most part; filaments paired, the anthers horseshoe-shaped. Ovary 5-loculate; style ± clavate, unbranched; stigma elongate, scabrous. Capsule ± globose, almost woody but easily compressed, indehiscent. Seeds obovoid, angular, pilose.

Distribution. A coastal plant, common in tropical countries. In Jammu and Kashmir State it has been reported only from Udhampur in the Jammu Province (Lambert, 1933: 3; Sharma & Kachroo, 1981: 113).

According to Ngwe (1971), the bark of this plant is used in treating piles, dysentery, and skin diseases.

7. MALVA L., Sp. Pl. 687. 1753; Gen. Pl. 5th Edition. 308. 1754.

Bismalva Medicus, Malvaceae. 39. 1787.

Over 100 species native to Europe, Asia, and Africa. Several species are naturalized in America, Australia, and New Zealand; represented in our area by nine species, three being cultivated or escapes from cultivation.

KEY TO THE SPECIES OF *MALVA* IN JAMMU AND KASHMIR STATE

1a. Epicalyx segments oblong, oblong-lanceolate, ovate, or ovate-lanceolate.
  2a. Leaves 5–7-lobed; staminal tube with simple or 2-rayed, retrorse hairs ..... 4. *M. bucharica*
  2b. Leaves 3–5-lobed; staminal tube stellately pubescent.
    3a. Stipules ovate-lanceolate; flowers 5–15 (rarely fewer than 5) in fascicles; petals 1.5–2 cm wide at apex; mericarps 10–14, glabrous ..... 3. *M. mauritiana*
    3b. Stipules lanceolate; flowers solitary or 2–4 in fascicles; petals 1 cm or less wide at apex; mericarps 9–12, glabrous or pubescent.
      4a. Petals oblong-obovate, 0.7–2 × 0.5 cm; mericarps pubescent ..... 1. *M. ambigua*
      4b. Petals obovate, 2–3 × 1 cm; mericarps glabrous ..... 2. *M. sylvestris*

1b. Epicalyx segments linear to linear-lanceolate.
5a. Plants biennial or perennial; mericarps 12–15, pubescent, smooth throughout; seeds pubescent ..... 5. *M. neglecta*
5b. Plants mostly annual, rarely biennial; mericarps 9–12, glabrous, striate-rugose at least on sides and margins; seeds glabrous.
6a. Calyx lobes ± rotate and spreading in fruit; corolla shorter than, equaling, or slightly exceeding calyx; staminal tube 1–2 mm long, glabrous; mericarps with raised reticulation on back, ± winged and acute along margins.
7a. Flowers solitary or paired, rarely more than 2 but never compact; pedicels distinctly visible, 0.3–2 cm long; calyx 5–6 mm long, slightly enlarged in fruit; margins of mericarps slightly winged, ± entire ..... 6. *M. microcarpa*
7b. Flowers usually many, compactly fasciculate; pedicels generally not visible, 3–5 mm long; calyx 3–5 mm long, enlarged in fruit to ca. 1 cm; margins of mericarps distinctly winged, undulate-toothed ..... 7. *M. parviflora*
6b. Calyx lobes incurved and enclosing the fruit; corolla 1½–2 times as long as calyx; staminal tube 3–5 mm long, glabrous or pubescent; mericarps smooth on back, unwinged and rounded along margins.
8a. Plants annual, pubescent; leaves suborbicular, 5–7-lobed; petioles 2–9 cm long; fruiting calyx less than 10 mm long; petals retuse, ca. 2 times the length of sepals, the claw ± pubescent; staminal tube retrorsely pubescent; fruit ca. 5 mm diam.; mericarps 12 ..... 8. *M. mohileviensis*
8b. Plants annual to biennial, glabrescent; leaves orbicular, usually 5-lobed; petioles (1.5–)4–20 (–24) cm long; fruiting calyx 10–15 mm long; petals scarcely notched, 1½ times or less the length of sepals, the claw glabrous; staminal tube glabrous or pubescent with simple hairs towards the apex; fruit 5–7 mm diam.; mericarps 10–12 ..... 9. *M. verticillata*

1. Malva ambigua Guss., Fl. Sicul. Prodr. 2: 331. 1828; Iljin in Shishkin & Bobrov, Fl. U.R.S.S. 15: 48. 1949. TYPE: described from Sicily (NAP).

Malva sylvestris L. var. *eriocarpa* Boiss., Fl. Orient. 1: 819. 1867.

Biennial to perennial herbs. Stems erect or ascending, usually weak, sparsely pubescent. Leaves ± semiorbicular, usually truncate (to cordate) at base, 3–5-lobed, serrate, glabrescent; stipules lanceolate, 2–4 mm long; petioles 2–8 cm long. Flowers axillary, solitary or in fascicles of 2–4; pedicels 1–3 cm long, with simple or stellate hairs. Epicalyx segments narrowly ovate or oblong. Calyx 3–6 mm long, stellately pubescent, slightly accrescent in fruit; lobes broadly triangular. Petals lilac, oblong-obovate, 0.7–2 × 0.5 mm, claw pubescent. Staminal tube 3–5 mm long, pilose with stellate hairs. Fruit 6 mm diam.; mericarps 9–12, pubescent, with raised reticulation on back. Seeds reticulate, glabrous.

Distribution. U.S.S.R., western and eastern Mediterranean, Iran, Afghanistan, and Pakistan. In our area infrequent in the Kashmir Valley, collected on house tops, waste places, moist sites, and sides of water courses.

Additional specimens examined. INDIA. KASHMIR: Ganderbal, *G. H. Dar 2499* (PF); Srinagar, *G. N. Javeid 590 A* (KASH); Srinagar, around graveyards in association with *Urtica dioica* L., *A. R. Naqshi 8165* (KASH).

First record for India.

2. Malva sylvestris L., Sp. Pl. 689. 1753; Masters in Hook. f., Fl. Brit. India 1: 320. 1874; Iljin in Shishkin & Bobrov, Fl. U.R.S.S. 15: 41. 1949; Kitamura, Fl. Afghan. 171. 1960; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 481. 1972; Abedin in Nasir & Ali, Fl. W. Pak. 130: 37. 1979. TYPE: described from western Europe, *Linn. Herb. no. 870/22* (holotype, LINN).

Biennial to perennial herbs. Stems erect, pubescent to glabrescent with simple (or bifid) hairs. Leaves ± suborbicular, truncate to broadly cordate at base, usually 3-lobed, crenate-dentate, sparsely pilose; stipules lanceolate, scarious, ca. 5 mm long; petioles 2–7 cm long, pilose. Flowers axillary, solitary or in fascicles of 2–4; pedicels ca. 2 cm long. Epicalyx segments ovate-oblong. Calyx 3–6 mm long, glabrescent with stellate hairs; lobes broadly triangular. Petals pink-purple, obovate, emarginate, 2–3 × 1 cm, the claw ciliate. Staminal tube ca. 3 mm long, pilose with stellate hairs. Fruit 5–6 mm diam.; mericarps 10–12, glabrous, reticulate. Seeds sparsely punctate.

Distribution. Western Europe, northern Africa, and Asia. Occasionally cultivated for greens in the Kashmir Valley and at certain places evidently escaped from cultivation, also collected from Ladakh (Stewart, 1972: 481).

Additional specimen examined. INDIA. KASHMIR: Srinagar, *A. R. Naqshi 8153* (KASH).

The species resembles *M. ambigua* Guss. and

M. mauritiana L. but differs from the former in having glabrous fruits and from the latter in having narrower and emarginate petals, and fewer flowers in the fascicles. Riedl (1976) followed Boissier (1867) in treating all of the above three species as *M. sylvestris* varieties *sylvestris*, *eriocarpa* Boiss., and *mauritiana* (L.) Boiss.

Malva sylvestris is believed to have been cultivated by ancient Greeks and Romans as a medicinal and edible plant. An infusion of flowers and leaves is used internally and as a gargle. The infusion, mixed with honey, is taken in case of catarrhal ailments, inflammatory conditions of the digestive tract, and constipation. A paste of leaves and flowers is applied in case of external inflammatory conditions. Flowers are also used in coloring medicine, liquors, and wool. The coloring properties are said to be due to glucoside malvin and diglucoside malvidin in the petals.

3. Malva mauritiana L., Sp. Pl. 689. 1753; Iljin in Shishkin & Bobrov, Fl. U.R.S.S. 15: 49. 1949; Abedin in Nasir & Ali, Fl. W. Pak. 130: 38. 1979. *Malva sylvestris* var. *mauritiana* (L.) Boiss., Fl. Orient. 1: 819. 1867; Masters in Hook. f., Fl. Brit. India 1: 320. 1874; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 481. 1972; Riedl in K. H. Rechinger, Fl. Iran. 120: 19. 1976. TYPE: *Linn. Herb. no. 870/24* (holotype, LINN).

Biennial to perennial herbs; stems mostly rigid, erect, rarely ascending, glabrescent with simple and bifid hairs. Leaves orbicular to suborbicular, truncate to shallowly cordate at base, 3–5-lobed, coarsely crenate, sparsely pilose with simple and bi- (tri-)fid hairs; stipules ovate-lanceolate, 3–6 mm long; petioles 4–12 cm long, with a line of dense hairs apically. Flowers axillary, in fascicles of 5–15, rarely fewer than 5; pedicels 1–4 cm long, unequal in length. Epicalyx segments ovate-lanceolate to ovate or oblong. Calyx 5–8 mm long, pilose with stellate hairs; lobes triangular, plicate at angles, accrescent in fruit. Petals dark pink to purple, 2–3 × 1.5–2 cm, obovate, retuse, claw pubescent at base. Staminal tube ca. 5 mm long, pilose with stellate hairs. Fruit 5–7 mm diam.; mericarps 10–14, glabrous, reticulate-wrinkled. Seeds finely punctate.

Distribution. Mediterranean region, western Europe, and U.S.S.R., elsewhere cultivated. In our area collected from Ladakh, where it grows, rare and handsome, along borders of cultivated fields, also reported from Kashmir by Stewart (1972: 481).

Additional specimen examined. INDIA. LADAKH: Nubra, along borders of cultivated fields, *A. R. Naqshi & G. N. Dar 7218* (KASH).

Most authors follow Boissier (1867) in treating this species as a variety of *Malva sylvestris* L. Whitmore (1979) considered *M. mauritiana* as synonymous with *M. sylvestris*.

The species is used for the same purpose as *M. sylvestris*. In the Iranian pharmacopoeia it is employed in a mixture with violets, *Nymphaea candida*, *Ziziphus jujuba*, *Alhagi camelorum*, and other species for preparation of the purgative infusion (Hooper, *Useful Plants and Drugs of Iran and Iraq*, 1937).

4. Malva bucharica Iljin, Bot. Mater. Gerb. Glavn. Bot. Sada RSFSR 5: 4. 1924; Shishkin & Bobrov, Fl. U.R.S.S. 15: 55. 1949; Riedl in K. H. Rechinger, Fl. Iran. 120: 19. 1976. TYPE: Kurgan-Tyube, *Roshewitz 175* (lectotype, LE).

Perennial herbs; stems erect or ascending, terete, glabrate or with simple to 2-branched hairs, sometimes completely glabrous. Leaves semiorbicular, truncate or ± cordate at base, 5–7-lobed, serrate-dentate, subglabrous, the nerves pilose with usually simple hairs; stipules ovate to broadly lanceolate; petioles 3–15 cm long. Flowers usually 3 in axils, crowded towards apices of branches; pedicels 1.5–5 cm long, much shorter than the subtending leaf; epicalyx segments oblong-lanceolate; calyx 3–7 mm long, glabrous or pubescent with simple and trifid hairs, the lobes accrescent and enclosing the fruit, triangular-ovate. Petals purplish, obovate or oblong-obovate, 0.8–2.2 × 0.4–1.2 cm, deeply notched, claw ± densely pilose. Staminal tube 4–6 mm long, with simple and 2-rayed, retrorse hairs. Fruit 6–7 mm diam.; mericarps (8–)10(–12), glabrous or pubescent, reticulate-rugose on back. Seeds puncticulate.

Distribution. U.S.S.R. and Kashmir. In our area it occurs frequently in the Kashmir Province but has not been collected in Jammu and Ladakh.

Additional specimens examined. INDIA. KASHMIR: Nagin, collector not known, *s.n.* (KASH); Srinagar, *G. N. Javeid 590 B* (KASH); Srinagar, Rambagh, *A. R. Naqshi 8152* (KASH); Srinagar, Hazratbal, roadsides near university gate, *G. H. Dar 7617* (KASH); Srinagar, Rainawari, in graveyards among *Urtica* bushes, *A. R. Naqshi 8178* (PF), *8179–81* (KASH).

In habit this species resembles *M. sylvestris* but differs from it mainly in having simple and two-rayed, retrorse hairs on the staminal tube. First record for Indian subcontinent.

5. Malva neglecta Wallr., Syll. Ratisb. 1: 140. 1824; Iljin in Shishkin & Bobrov, Fl. U.R.S.S. 15: 56. 1949; Hu, Fl. China, Malvaceae. 6. 1955; Kitamura, Fl. Afghan. 271. 1960; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 481. 1972; Singh & Kachroo, Forest Fl. Srinagar. 151. 1976; Riedl in K. H. Rechinger, Fl. Iran 120: 24. 1976; Abedin in Nasir & Ali, Fl. W. Pak. 130: 38. 1979. TYPE: without exact locality, Germany, *Wallroth s.n.* (E).

Malva rotundifolia sensu Maxim., Acta Hort. Petrop. 11: 78. 1890, non L.; Masters in Hook. f., Fl. Brit. India 1: 320. 1874.
M. vulgaris Ten., Fl. Napol. Suppl. 1: 62. 1811–1815.
M. lignescens Iljin, Bot. Mater. Gerb. Glavn. Bot. Sada RSFSR 2: 173. 1921.

Biennial to perennial herbs with woody bases. Stems prostrate or decumbent, pubescent with stellate hairs, especially on younger parts. Leaves orbicular-reniform, cordate at base, crenate-denticulate, occasionally shallowly 5(–7)-lobed on elongated branches, sparsely pilose with simple and stellate hairs adaxially and densely so with stellate hairs abaxially; stipules ovate-lanceolate, ca. 5 mm long; petioles 3–15 cm long, stellately villous. Flowers axillary, 3–4 in a fascicle, those on the lower branches occasionally solitary; pedicels, 0.5–5 cm long, unequal in length, much longer than the flower but shorter than the subtending leaf; epicalyx segments linear to linear-lanceolate; calyx 5–8 mm long, stellately pilose; lobes triangular. Petals purplish to pinkish, sometimes white, 10–13 × 3–4 mm, oblong-obovate, retuse, claw pubescent on the margin. Staminal tube 4–5 mm long, pubescent with simple, ± retrorse hairs. Fruit 5–7 mm diam.; mericarps 12–15, pubescent, smooth. Seeds pubescent.

Distribution. Native to Old World, naturalized in America. In our area occurring widely in Kashmir Valley along wastelands, meadows, and cultivated fields from 1,600 m altitude to the alpine zone; also reported from the Jammu and Ladakh regions. It is commonly used as a wild vegetable under the local name "Sotsal."

Additional specimens examined. INDIA. KASHMIR: Srinagar, Habak, *G. N. Javeid 121* (KASH); Womens' College campus, *D. Sethi 101* (KASH); Harwan, *G. Singh 1986* (KASH); Tangmarg, *A. R. Naqshi 599* (KASH); Rainawari, *A. R. Naqshi 8159–60* (KASH); Ganderbal, exposed hill slopes, *G. H. Dar 2325–27* (KASH); Zakura, 1,630 m, *G. H. Dar 1053–57* (KASH), *1058* (PF); Srinagar (Lal Bazar), *A. R. Naqshi 8166* (KASH); Sonamarg, *G. H. Dar 7679–7682* (KASH); Gund-Haknar, *G. H. Dar 8644* (KASH); Hang (Sonamarg), *G. H. Dar 8643* (KASH); *Chatterhama* (Srinagar), *G. H. Dar 8841* (KASH); Manigam (Lar), *G. H. Dar 5328–31* (KASH).

A number of varieties and forms of this species can be distinguished in our area. However, their recognition is deferred until a satisfactory monographic work on the species within the area is available.

These plants are said to be used in medicine due to the high content of mucilage in the foliage and roots. The leaves contain vitamin C and provitamin A, while the seeds contain about 18% of a light green oil. A decoction of leaves and roots is used as a gargle for treatment of inflammatory conditions of the respiratory tract and as fomentations for external treatment of skin inflammations, ulcerations, and swellings. An infusion of leaves with milk is used for its diuretic effect. A decoction of the leaves is used as an enema to relieve constipation (Dar et al., 1984). The petioles are used for treating babies, instead of glycerine clysters.

6. Malva microcarpa Pers., Syn. Pl. 2: 251. 1806; Riedl in K. H. Rechinger, Fl. Iran. 120: 27. 1976; Abedin in Nasir & Ali, Fl. W. Pak. 130: 41. 1979. *Malva parviflora* var. *microcarpa* (Pers.) Loscos, Trat. Pl. Aragon 2: 203. 1877; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 481. 1972. TYPE: Herb. *Persoon s.n.* (holotype, L).

Annual herbs. Stems prostrate or ascending, stellately villous. Leaves orbicular-reniform, cordate at base, 3–7-angular, crenate to serrate, glabrescent; stipules ovate or lanceolate, 2–4 mm long; petioles 1–10(–25) cm long. Flowers axillary, solitary or paired, rarely more but then never compact; pedicels 0.3–2 cm long, distinctly visible; epicalyx segments linear; calyx 5–6 mm long, slightly enlarged and rotate in fruit; lobes triangular, acute to acuminate. Petals white (sometimes with pinkish tips), equaling or slightly exceeding the calyx. Staminal tube 1–2 mm long, glabrous. Fruit 3–6 mm diam.; mericarps 9–10, glabrous, reticulate, with slightly winged margins. Seeds glabrous.

Distribution. Native to the Mediterranean Region, Malaysia, Iran, Afghanistan, and Pakistan.

In our area it has been collected, infrequently, from Jammu.

Additional specimen examined. INDIA. JAMMU: Tilo Talab, common along drains; annual herbs, mucilaginous when bruised, flowers white, *B. M. Sharma 389* (KASH).

First record for India.

7. **Malva parviflora** L., Demonstr. Pl. 18. 1758; Sp. Pl. 2nd Edition. 269. 1763; Masters in Hook. f., Fl. Brit. India 1: 321. 1874; Iljin in Shishkin & Bobrov, Fl. U.R.S.S. 15: 63. 1949; Kitamura, Fl. Afghan. 271. 1960; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 481. 1972; Riedl in K. H. Rechinger, Fl. Iran. 120: 23. 1976; Abedin in Nasir & Ali, Fl. W. Pak. 130: 42. 1979. TYPE: described from Barbary (north Africa), *Linn. Herb. no. 870/17* (holotype, LINN).

Annual herbs; stems erect or prostrate-ascending, sparsely pubescent with stellate hairs to glabrescent. Leaves orbicular-reniform, cordate at base, crenate-serrate, often shallowly 3–7-lobed, sparsely pubescent with simple or 2-fid hairs on the adaxial surface, usually stellately pilose abaxially; stipules lanceolate to ovate, 2–5 mm long; petioles 3–17 cm long, longer than blade, simple and stellately pubescent, especially apically. Flowers usually in compact axillary fascicles; pedicels 3–5 mm long, generally not visible, subglabrous. Epicalyx segment linear. Calyx 3–5 mm long, pilose with stellate hairs, accrescent in fruit to ca. 1 cm; lobes triangular, mucronate. Petals white, sometimes pinkish at the tips, usually shorter than or equaling the calyx, oblong, slightly narrowed at base, scarcely notched at apex, claw glabrous. Staminal tube ca. 2 mm long, glabrous. Fruit 5–6 mm diam.; mericarps 9–10, glabrous, with raised reticulation and toothed, winglike margins. Seeds glabrous.

Distribution. Mediterranean Region, Anatolia, Iran, Iraq, Afghanistan, Pakistan, India, and Arabia. Many workers (Javeid, 1970; Stewart, 1972; Sharma & Kachroo, 1981) have reported this species from our area, but there is no authentic specimen, because all the specimens under this name turned out to be either *Malva neglecta* or *M. microcarpa*.

8. **Malva mohileviensis** Downar, Bull. Soc. Mosc. 1: 177. 1861; Iljin in Shishkin & Bobrov, Fl. U.R.S.S. 15: 64, pl. 3, f. 1. 1949; Abedin in Nasir & Ali, Fl. W. Pak. 130: 43. 1979. TYPE: vicinity of Mogilev (LE).

Annual herbs; stems erect, ± purplish, pubescent with simple and 2-fid hairs, especially towards the apex. Leaves suborbicular, cordate at base, 5–7-lobed, serrulate to crenulate-dentate, sparsely pubescent with simple or 2-fid hairs on the upper surface, more pubescent and with mixed stellate hairs beneath; stipules lanceolate-ovate, 3–5 mm long; petioles 2–9 cm long. Flowers axillary, in fascicles of 4–7(–many); pedicels 5–10 mm long. Epicalyx segments linear, green to purple. Calyx ca. 5 mm long, green to purple, glabrescent, accrescent and scarious in fruit, the lobes triangular. Petals pinkish, about twice the length of calyx, obovate, retuse, claw slightly pubescent. Staminal tube ca. 4 mm long, retrorsely pubescent. Fruit ca. 5 mm diam.; mericarps 12, glabrous, smooth on the back, transversely rugose along the rounded margins, radially wrinkled on the sides. Seeds minutely puncticulate.

Distribution. Japan, China, U.S.S.R., Pakistan. In our area it occurs infrequently in Kashmir and Ladakh.

Additional specimens examined. INDIA. KASHMIR: Sonamarg, along roadsides just near the Shutkar Bridge, *G. H. Dar 8483* (PF), *8484* (KASH). LADAKH: Leh, *A. R. Naqshi & G. N. Dar 7217* (KASH).

In Tibetan medicine the flowers of this species are used as a diuretic. The leaves and young shoots can be used as a salad or as a vegetable. It is a valuable forage plant due to a high protein content and tender consistency. It has been estimated that this species contains twice as much protein as any other forage plant, so it increases the yield and quality of milk when fed to cows. First record for India.

9. **Malva verticillata** L., Sp. Pl. 689. 1753; Masters in Hook. f., Fl. Brit. India 1: 320. 1874; Iljin in Shishkin & Bobrov, Fl. U.R.S.S. 15: 68. 1949; Hu, Fl. China, Malvaceae. 5. 1955; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 481. 1972; Riedl in K. H. Rechinger, Fl. Iran. 120: 22. 1976; Abedin in Nasir & Ali, Fl. W. Pak. 130: 43. 1979. LECTOTYPE: *Linn. Herb. no. 870/26* (LINN).

9a. **Malva verticillata** var. **verticillata** [see Abedin in Nasir & Ali, Fl. W. Pak. 130: 45. 1979].

M. chinensis Miller, Gard. Dict. 8th Edition. 670. 1768.

Annual or biennial herbs; stems erect, green to purplish, sparsely stellately pubescent. Leaves usually orbicular, cordate to subtruncate at base, usu-

ally 5-lobed, coarsely crenate-dentate, glabrescent on the adaxial surface with simple, or 2-fid hairs, more pubescent abaxially with stellate, simple, or 2-fid hairs; stipules lanceolate, 5 mm long; petioles 4–20(–24) cm long, glabrescent, with villous grooves. Flowers axillary, subsessile, in dense and compact fascicles of 5–many; pedicels 5–8 mm long, ± of equal length, all hidden by flowers or fruits. Epicalyx segments linear or linear-lanceolate, acute. Calyx 5–6 mm long, sparsely hirsute with stellate hairs, prominently reticulate-veined, accrescent in fruit to 10–15 mm, the lobes triangular, with long-ciliate margins. Petals purplish, 7–9 mm long, scarcely notched, the claws glabrous. Staminal tube 3–5 mm long, glabrous or pubescent with simple hairs towards the apex. Fruit 5–7 mm diam., enclosed in accrescent calyx, the mericarps 10–12, glabrous, smooth on the back, rugose along the rounded margins, radially striate on the sides. Seeds glabrous.

Distribution. China, Europe, Asia, Ethiopia, Egypt. In our area commonly cultivated in the Kashmir Valley for its leaves which are used as a vegetable, also collected from Jammu and Ladakh. Vernacular names: "Parim sotsal", "Bagh sotsal."

Additional specimens examined. INDIA. KASHMIR: university campus, *A. R. Naqshi 107* (KASH); Chatterhama (Srinagar), *G. H. Dar 7562* (KASH, PF); Beehama, *G. H. Dar 7563–65* (KASH); Hirpur (Pir Panjal), *G. A. Gammie s.n.* (K, fide Abedin, 1979). JAMMU: Poonch Dist., *A. Rashid, E. Nasir & RRS 25586* (RAW).

9b. Malva verticillata var. **rafiqii** S. Abedin in Nasir & Ali, Fl. W. Pak. 130: 45. 1979. TYPE: Hazara District, Pakistan, *S. Abedin & M. Qaiser 9109* (holotype, KUH).

Malva verticillata var. *chinensis* sensu Hu, Fl. China, Malvaceae. 6, tab. 15, f. 5. 1955. Not *M. chinensis* Miller.

Differs from the preceding variety in having smaller habit, comparatively thinner stems, smaller and shallowly 3–5-lobed leaves with shorter (1.5–10 cm) petioles, flowers in looser fascicles of 2–6, pedicels of unequal length, 10–20(–25) mm long, the longer ones not hidden by the clusters of flowers or fruits.

Distribution. China and Pakistan and in the Kashmir Valley.

Additional specimens examined. INDIA. KASHMIR: Ganderbal, *G. H. Dar 1762–66* (KASH); Haknar (Gund), 2,050 m, *G. H. Dar 8640* (PF), *8641–8642* (KASH).

8. ALTHAEA L., Sp. Pl. 686. 1753; Gen. Pl. 5th Edition. 307. 1754.

About 12 species, distributed in Africa, Asia, and Europe; two species are recorded from our area.

1a. Leaves entire to shallowly 3-lobed; corolla almost twice the length of calyx; staminal tube pubescent; mericarps 15–25, pubescent throughout; seeds smooth, not verrucose ..... 1. *A. officinalis*

1b. Leaves deeply 3–5-fid or parted; corolla usually less than twice the length of calyx; staminal tube almost glabrous; mericarps 12–18, pubescent towards apex, glabrous at base; seeds minutely whitish-verrucose on back ..... 2. *A. broussonetiifolia*

1. Althaea officinalis L., Sp. Pl. 686. 1753; Masters in Hook. f., Fl. Brit. India 1: 319. 1874; Iljin in Shishkin & Bobrov, Fl. U.R.S.S. 15: 131. 1949; Kitamura, Fl. Afghan. 270. 1960; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 417. 1972; Riedl in K. H. Rechinger, Fl. Iran. 120: 39. 1976; Abedin in Nasir & Ali, Fl. W. Pak. 130: 46. 1979. LECTOTYPE: *Linn. Herb. no. 863/1* (LINN).

Perennial herbs, stems erect, with densely tomentose branches. Leaves triangular to broadly ovate, acute, base rounded or truncate, the margin irregularly serrate-dentate, sometimes superficially 3-lobed, densely pubescent on both surfaces, especially beneath; stipules linear-lanceolate, caducous. Flowers axillary, borne on many-flowered peduncle; pedicels 2–10 mm long. Epicalyx segments 8–12, linear. Calyx with the lobes connate below the middle, 5-lobed, 6–12 mm long, persistent. Corolla pinkish to white, 2–3 cm diam.; petals broadly obovate to oblong-obovate, 1.2–2.2 cm long, slightly notched at apex, the claw with ciliate margin. Staminal tube cylindric, with short-papillose hairs. Mericarps 15–25, minutely stellate-pubescent throughout. Seeds smooth, glabrous.

Distribution. Europe, Palestine, Syria, Turkey, Iran, Afghanistan, Pakistan, India. Though the species has been collected in the Kashmir Valley, it appears to be rare in our area now. A report from Baramulla, Kashmir is in Stewart (1972).

Additional specimens examined. INDIA. KASHMIR: Bandipur, *Jacquemont 1082*; Pampore, *Drum 15029.*

Abedin (1979) described the fruit of this species as glabrous in his key, perhaps an error.

2. Althaea broussonetiifolia Iljin in Shishkin & Bobrov, Fl. U.R.S.S. 15: 678. 1949. TYPE: Stalingrad (Olim Zarizyn), *Wunderlich 1839* (LE).

Perennial herbs; stems ± erect, densely stellate-pubescent on almost all parts. Leaves deeply 3–5-fid or -parted with irregularly dentate, oblong-lanceolate lobes, densely pubescent on both surfaces, especially beneath; stipules linear, caducous. Flowers on axillary and terminal racemose-paniculate peduncles; pedicels much shorter than calyx. Epicalyx segments 7–9, lanceolate. Calyx lobes 5, connate below the middle, 6–10 mm long, persistent. Corolla pink, 2–2.5 cm diam.; petals obovate to oblong-obovate, 8–15 mm long, slightly notched at apex, the claw fringed-pubescent. Staminal tube cylindric, almost glabrous. Mericarps 12–18, stellate-pubescent except at base. Seeds sparsely and minutely whitish-verrucose, especially in the lower part.

Distribution. U.S.S.R. The taxon, hitherto considered endemic to the U.S.S.R., has been collected in the Kashmir Valley. Apparently it is rare in our area.

Additional specimens examined. INDIA. KASHMIR: Narbal-Suzeath, on the borders of vegetable gardens, *A. R. Naqshi 8167* (PF), *8168* (KASH); Shalteng (Srinagar), *G. N. Javeid 596* (KASH).

First record for Indian subcontinent.

9. ALCEA L., Sp. Pl. 687. 1753; Gen. Pl. 5th Edition. 307. 1754.

About 60 species distributed chiefly in eastern Mediterranean Region; represented in our area by three species, all cultivated or escapes from cultivation.

KEY TO THE SPECIES OF *ALCEA* IN KASHMIR AND JAMMU STATE

1a. Upper leaves undivided or shallowly lobed.
  2a. Stem and branches sparsely setose with stellate hairs when young, ± glabrous at maturity ..... 1. *A. rosea*
  2b. Stem and branches densely bristly with persistent stellate hairs ..... 3. *A. pallida*
1b. Upper leaves palmately lobed almost to the base ..... 2. *A. lavateriflora*

1. Alcea rosea L., Sp. Pl. 687. 1753; Iljin in Shishkin & Bobrov, Fl. U.R.S.S. 15: 126. 1949; Zohary, Israel J. Bot. 12: 12. 1963; Abedin in Nasir & Ali, Fl. W. Pak. 130: 49. 1979. TYPE: *Linn Herb. no. 869/1* (LINN).

Biennial (or perennial) herbs; stem erect, sparsely setose with stellate hairs when young, ± glabrous at maturity. Leaves orbicular-ovate, cordate at base, obtuse at apex, the lower ones shallowly 5–7-lobed, the upper leaves undivided or shallowly 3-lobed, crenate-dentate, scabrous with stellate pubescence on both surfaces; stipules ovate, tricuspidate. Flowers axillary, solitary or subfasciculate, the inflorescences spikelike towards the apices due to shorter pedicels and gradual diminution of the subtending leaves into leaflike bracts. Epicalyx 6–7-lobed, the lobes ovate-lanceolate. Calyx campanulate, 5-lobed, densely stellate-pubescent like the epicalyx. Corolla 5–8 cm diam., of various colors but usually red; petals obovate-cuneate, notched at apex, the claw barbate. Staminal tube 5-angled, glabrous. Fruit depressed, covered by persistent calyx; mericarps 20–40, stellate-pubescent, channeled and winged dorsally. Seeds reniform, pubescent.

Distribution. According to Zohary (1963), "Wild *A. rosea* L. seems to be indigenous almost exclusively on the Aegean islands and the adjacent Balkan Peninsula. The areas of its origin are no doubt the northeastern Mediterranean countries, but not China which is beyond the natural range of the genus." *Alcea rosea* is cultivated as an ornamental almost everywhere. In the Kashmir Valley it often grows as an escape from cultivation, together with the two following species. Sharma & Kachroo (1981) reported this species from Batote, Jammu.

Additional specimens examined. INDIA. KASHMIR: Srinagar, *G. N. Javeid 33* (KASH); Sind Valley, Prang, *G. H. Dar 6217* (KASH); Ganderbal, *G. H. Dar 6619* (KASH, PF); university campus, *A. R. Naqshi & G. N. Dar 8169* (KASH); women's college campus, *D. Sethi 30* (KASH).

The flowers and seeds of this species are said to have diuretic properties, and the roots and seeds are used as demulcents. According to Dar et al. (1984), a decoction of the roots boiled with water and milk is applied externally for treating dermatitis and goiter; it is also given to pregnant women to ease delivery. A decoction of flowers with milk and "gud" is reportedly applied for boils.

2. Alcea lavateriflora (DC.) Boiss., Fl. Orient. 1: 828. 1867; Riedl in K. H. Rechinger, Fl. Iran. 120: 65. 1976; Abedin in Nasir & Ali, Fl. W. Pak. 130: 50. 1979. *Althaea lavateriflora* DC., Prodr. 1: 437. 1824; Kitamura, Fl. Afghan. 270. 1960. TYPE: Prope Seydeol rodius Lipain, *Meryon.*

Alcea persarum Bornm. sensu Zohary, Israel. J. Bot. 12: 15. 1963.

This species resembles *A. rosea* L. in habit and flowers but differs chiefly in having deeply palmate-

lobed leaves, especially towards the apices of branches, and in having narrower calyx lobes.

Distribution. Turkey, Greece, and Bulgaria; occasionally cultivated in Iraq, Iran, Pakistan, and elsewhere.

Additional specimens examined. INDIA. KASHMIR: university campus, *A. R. Naqshi & G. N. Dar 8170* (KASH); Ganderbal, Power House, *G. H. Dar 6620–6621* (KASH); Prang, *G. H. Dar 6216* (KASH, PF).

3. Alcea pallida (Waldst. & Kit.) Besser, Enum. Pl. 2: 872. 1822; Iljin in Shishkin & Bobrov, Fl. U.R.S.S. 15: 118. 1949; Zohary, Israel J. Bot. 12: 11. 1963; Abedin in Nasir & Ali, Fl. W. Pak. 130: 50. 1979. *Althaea pallida* Waldst. & Kit. in Willd., Sp. Pl. 3: 773. 1800; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 477. 1972. TYPE: described from Hungary (Prague).

This species also resembles *A. rosea* L. in general habit, leaves, and flowers but differs in having dense, persistent, stellate hairs on the stem and branches and in having transversely rugose wings on the mericarps.

Distribution. Central Europe, Balkan Peninsula, and Asia Minor; cultivated elsewhere.

Additional specimens examined. INDIA. KASHMIR: Sind Valley, Ganderbal, *G. H. Dar 6618* (KASH, PF).

All species of *Alcea* L. are raised as ornamentals in the Kashmir Valley under the local name of "Saz Posh." They are often grown in close associations. The three species were, until now, referred to *Althaea rosea* (L.) Cav. However, the genera *Alcea* and *Althaea* differ so markedly, particularly in the structures of the staminal column and carpels, that they are no longer considered a single genus. In fact *Alcea* approaches more closely *Lavatera* than *Althaea*.The species of *Alcea* contain 12–14% fiber in the stem and are suitable for paper production. The flowers contain mucilage and are used for gargling. They are also taken internally as an emollient for treatment of catarrhal gastric complaints. A dye extracted from the petals is used for coloring wines, vinegar, liquors, food products, silk, and wool.

10. LAVATERA L., Sp. Pl. 690. 1753; Gen. Pl. 5th Edition. 308. 1754.

Some 45 species, chiefly Mediterranean, but extending to the Canaries, northwest Himalaya, central Asia, eastern Siberia, Australia, and the U.S.A. (California); represented in Jammu and Kashmir by a single species.

Lavatera kashmiriana Cambess. in Jacquem., Voy. Inde 4: 29, tab. 32. 1844; Masters in Hook. f., Fl. Brit. India 1: 319. 1874; Iljin in Shishkin & Bobrov, Fl. U.R.S.S. 15: 78. 1949; Riedl in K. H. Rechinger, Fl. Iran. 120: 14. 1976; Singh & Kachroo, Forest Fl. Srinagar. 151. 1976; Abedin in Nasir & Ali, Fl. W. Pak. 130: 51. 1979. TYPE: India. Kashmir: *Jacquemont s.n.* (K).

Malva cachemiriana (Cambess.) Alef., Osterr. Bot. Z. 12: 258. 1862.

Lavatera cachemiriana var. *haroonii* sensu Abedin in Nasir & Ali, Fl. W. Pak. 130: 52. 1979.

Lavatera thuringiaca L. var. *macromera* Litw., Russk. Bot. Zurn. 7: 117. 1922. *L. thuringiaca* subsp. *macromera* (Litw.) Iljin, Bot. Syst. Leningrad 5: 7. 1924.

Perennial, densely stellate-pubescent herbs with erect terete stems. Leaves orbicular, the base truncate to slightly cordate, margin crenate-serrate, 3–7-angled or palmatifid to parted; stipules foliaceous, persistent. Flowers solitary, axillary; pedicels 3–6 cm long, articulate near the apex. Epicalyx segments 3, foliaceous, connate in the lower half, ovate-orbicular, mucronate, accrescent in fruit. Calyx 5-lobed, longer than epicalyx, the lobes triangular to deltoid, accrescent in fruit. Corolla 4–7.5 cm diam., pink-lilac; petals obovate, deeply notched. Staminal tube densely pubescent at base, antheriferous in the upper half. Fruit discoid; mericarps 20–25, glabrous, ± rugose. Seeds glabrous.

Distribution. India (Himalayan Mountains), Pakistan, Afghanistan, U.S.S.R., Iran. Stewart (1972) reported it for Poonch, Jammu.

Additional specimens examined. INDIA. KASHMIR: Sonamarg, *A. R. Naqshi 3975* (KASH); Aharbal, *A. R. Naqshi 7523* (KASH); Baltal, *A. R. Naqshi 4010–12* (KASH); Harwan, *G. Singh 1984* (KASH); Hadurah (Ganderbal), *G. H. Dar 2176* (KASH); Naranag, *G. H. Dar 4142–43, 45* (KASH), *4144* (PF); Soraphraw (Sind Valley), *G. H. Dar 8594* (PF), *8595–96* (KASH); Najwan (Kangan), *G. H. Dar 6827* (KASH); Sonamarg, *G. H. Dar 7787* (KASH), *7788* (PF); Harwan, *G. N. Javeid 361* (KASH); Ferozpur Nullah (Gulmarg), *U. Dhar 1258* (KASH).

In Kashmir, this species serves as a vegetable to hill tribes under the name of "Wan Sotsal." It can be raised as an ornamental. Its seeds contain about 12% oil, and a small amount of vitamin C is present in the stem and leaves. The plant has the capacity of yielding a good quality of fiber for binder twine, string, and ropes.

Based on leaf pubescence Abedin (1979) recognized two varieties as follows: adaxial surface of leaf with dense stellate hairs (var. *cachemiriana*) and adaxial surface of leaf except veins with simple and fascicled hairs (var. *haroonii*). Close scrutiny of a number of collections from different parts of our state, however, revealed that the varietal distinction does not hold up. The difference in the pubescence of upper leaf surface does not seem to be constant, and intermediate conditions are not uncommon.

11. ABUTILON Miller, Gard. Dict. Abr. 4th Edition. 1: AB. 1754; 8th Edition. 1768.

Over 150 species distributed in the tropics and subtropics of both hemispheres; represented in our area by four species.

KEY TO THE SPECIES OF *ABUTILON* IN JAMMU AND KASHMIR STATE

1a. Corolla 2.5–3.5 cm diam.; staminal tube 5–8 mm long; mericarps (14–)15–20 ..... 4. *A. indicum*
1b. Corolla 1–2 cm diam.; staminal tube 1–4 mm long; mericarps 10–16.
2a. Annual herbs; staminal tube glabrous ..... 2. *A. theophrastii*
2b. Perennial suffruticose herbs; staminal tube stellate-pubescent to puberulent.
3a. Calyx lobes deltoid-ovate, erect in fruit; petals 10–12 mm long; fruit cylindrical; mericarps usually 10; seeds furfuraceous-dotted ..... 1. *A. ramosum*
3b. Calyx lobes lanceolate, reflexed in fruit; petals 7–9 mm long; fruit ovoid; mericarps 13–16; seeds stellately pilose ..... 3. *A. bidentatum*

1. Abutilon ramosum (Cav.) Guill. & Perr. in Guill. et al., Fl. Seneg. Tent. 1: 68. 1831; Masters in Hook. f., Fl. Brit. India 1: 328. 1874; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 477. 1972; Abedin in Nasir & Ali, Fl. W. Pak. 130: 55. 1979; Sharma & Kachroo, Fl. Jammu 1: 111. 1981.
Sida ramosa Cav., Diss. 1. 28, tab. 6, f. 1. 1785. TYPE: Senegal, *Adanson* (holotype, MA, photo; isotype, P).

Abutilon sparmanoides Guill. & Perr. in Guill. et al., Fl. Seneg. Tent. 1: 70. 1831.
A. elaeocarpoides Webb, Fragm. Fl. Aethiop. 53. 1854.
A. sidoides A. Gibson, Bombay Fl. 18. 1861.

Perennial, suffruticose herbs, tomentose with stellate and long, spreading hairs. Leaves broadly ovate, the base cordate, the apex acuminate, the margin coarsely crenate-serrate, often 3-lobate; stipules filiform to linear. Flowers axillary or terminal, solitary or paired or divided above dichotomously as in a cyme; pedicels shorter than petioles. Calyx cupular, 5-lobed; lobes deltoid-ovate, acuminate-cuspidate. Corolla yellow, ca. 1.5 cm diam.; petals 10–12 mm long. Staminal tube very short, puberulous. Fruit cylindrical; mericarps usually 10, biaristate with awns ca. 2 mm long. Seeds 2–3 per mericarp, furfuraceous-dotted.

Distribution. Tropical Africa, Arabia, Pakistan, and India. Confined in our area to the Jammu Province. For a Billawar report see Lambert (1933).

Additional specimen examined. INDIA. JAMMU: Ram Nagar, among *Carissa spinarum* L., tomentose green shrub with yellow flowers, *B. M. Sharma 674* (KASH).

2. Abutilon theophrastii Medicus, Malvenfam. 28. 1787; Hu, Fl. China, Malvaceae. 31. 1955; Kitamura, Fl. Afghan. 269. 1960; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 477. 1972; Riedl in K. H. Rechinger, Fl. Iran. 120: 7. 1976; Abedin in Nasir & Ali, Fl. W. Pak. 130: 61. 1979. LECTOTYPE: India: Herb. Cliff. (BM).

Sida abutilon L., Sp. Pl. 685. 1753.
Abutilon avicennae Gaertner, Fruct. Sem. Pl. 2: 251, tab. 135, f. 1. 1791; Masters in Hook. f., Fl. Brit. India 1: 327. 1874.
A. behrianum F. Muell. in Trans. & Proc. Philos. Inst. Victoria 1: 13. 1855.

Annual, velutinous herbs. Leaves orbicular or broadly ovate, the base deeply cordate, the apex acuminate, the margin crenulate or undulate; stipules caducous. Flowers axillary, solitary or in few-flowered terminal racemes; pedicels shorter than petioles. Calyx 5-lobed; lobes ovate or lanceolate, acute. Corolla yellow, 1–2 cm diam.; petals 1–1.2 cm long, obovate. Staminal tube 2–4 mm long, glabrous. Fruit hemispherical; mericarps 12–16, strongly birostrate with awns 3–5 mm long. Seeds 3 per mericarp, stellate-pilose.

Distribution. Native to India, introduced and naturalized in northern America, northern Asia, and westward to southern Europe. Confined in our area to the Kashmir Valley, where this is the only *Abutilon* growing now, although some other species have been reported by earlier workers. Vernacular name: "Yachkad."

Additional specimens examined. INDIA. KASHMIR: university campus, *A. R. Naqshi 189* (KASH); Srinagar, *A. R. Naqshi 3981* (KASH); Narbal, *A. R. Naqshi & G. N. Dar 8171* (PF), *8172* (KASH); Shalteng, *G. N. Javeid s.n.* (Sind Valley) (KASH); *G. H. Dar 8820* (KASH); Jhelum River, cultivated fields, *R. R. & I. D. Stewart 4980* (RAW).

Abutilon, especially *A. theophrastii*, has been long cultivated for its coarse fiber suitable for making ropes, sackcloth, binder twine, string, and fishing nets. Its fiber is fairly tough, water resistant, and brittle. In America this is said to be preferred over jute and Manila hemp. The stem is used for paper manufacture and as fuel. The seeds yield up to 30% of a yellow, tasteless, and odorless oil, which approaches cotton oil, sesame oil, and peanut oil in its chemical composition. The oil is suitable for use in food and for hydrogenation. Inferior grades may be used as varnish oil and in soap manufacture. The flowers are used for coloring wines and, in China, for making ink. A decoction of roots and infusion of flowers is used internally and externally against inflammatory conditions.

3. Abutilon bidentatum Hochst. ex A. Rich., Tent. Fl. Abyss. 1: 68. 1847; Masters in Hook. f., Fl. Brit. India 1: 326. 1874; Kitamura, Fl. Afghan. 269. 1960; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 475. 1972; Riedl in K. H. Rechinger, Fl. Iran. 120: 5. 1976; Abedin in Nasir & Ali, Fl. W. Pak. 130: 63. 1979. TYPE: Abyssinia, prope Aguar, prov. Modat, *Schimper 1003* (K).

Abutilon cornutum Dalz. ex T. Cooke, Fl. Bombay 1: 98. 1901.

A. pakistanicum Jafri et Ali in Jafri, Fl. Karachi. 220. 1966.

Perennial, suffruticose herbs, canescent-tomentose with stellate, weak, spreading hairs. Leaves broadly ovate, the base deeply cordate, the apex acute-acuminate, the margin crenate-dentate, rarely 3-angular; stipules filiform. Flowers solitary, axillary; pedicels longer or shorter than petioles. Calyx 5-lobed, slightly accrescent; lobes lanceolate, ultimately reflexed. Corolla pale yellow to yellow, 1–1.5 cm diam.; petals 7–9 mm long, obovate. Staminal tube 2–3 mm long, stellate-pubescent. Fruit ovoid; mericarps 13–16, acute-acuminate, awn 1–2 mm long. Seeds 3 per mericarp, sparsely pilose with stellate hairs.

Distribution. India, Pakistan, Iran, tropical Africa, and Arabia. Apparently confined to the Jammu region in our area. Stewart (1972) reported it from the Kashmir Valley, but we have not seen any specimens. Also note: Jammu: Billawar (Lambert, 1933: 3; Sharma & Kachroo, 1981: 111); Poonch, Mirpur. Kashmir: Jhelum Valley road; Barsala (Stewart, 1972: 476).

4. Abutilon indicum (L.) Sweet, Hort. Brit. 1st Edition. 54. 1826; Masters in Hook. f., Fl. Brit. India 1: 326. 1874; Hu, Fl. China, Malvaceae. 32. 1955; Ngwe, Union Burma J. Life Sci. 4: 207. 1971; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 476. 1972; Riedl in K. H. Rechinger, Fl. Iran. 120: 6. 1976; Abedin in Nasir & Ali, Fl. W. Pak. 130: 69. 1979; Sharma & Kachroo, Fl. Jammu 1: 111. 1981. *Sida indica* L. in Torner, Cent. Pl. 2: 26. 1756. LECTOTYPE: *Linn. Herb. no. 866/29* (LINN).

Sida populifolia Lam., Encycl. 1: 7. 1783. *Abutilon populifolium* (Lam.) Sweet, Hort. Brit. 1st Edition. 53. 1826. *A. indicum* var. *populifolium* (Lam.) Wight & Arn. ex Masters in Hook. f., Fl. Brit. India 1: 326. 1874.

A. indicum var. *microphyllum* Hochr., Annuaire Conserv. Jard. Bot. Genève 6: 20. 1902.

A. badium Husain & Baquar, Phyton 15: 229. 1974.

Perennial, suffruticose herbs to subshrubs, canescent with stellate hairs; branches and petioles generally purple on one side. Leaves broadly ovate, the base cordate, the apex acute or acuminate, the margin coarsely dentate, sometimes 3-angular; stipules linear. Flowers solitary, axillary; pedicels longer than petioles. Calyx 5-lobed, not or slightly accrescent in fruit; lobes lanceolate to ovate, mucronate, ultimately reflexed. Corolla orange-yellow to yellow, 2.5–3.5 cm diam.; petals 1–1.5 cm long, obovate. Staminal tube 5–8 mm long, stellate-hirsute. Fruit ovoid-truncate; mericarps (14–)15–20, very short-awned, erect at maturity. Seeds 3 per mericarp, minutely stellate-pilose.

Distribution. Tropics and subtropics of the New and Old worlds. Confined to the Jammu region in our area.

Additional specimens examined. INDIA. JAMMU: Ram Nagar forest, common along hedges; erect shrubs, profusely branched, flowers orange-yellow, *B. M. Sharma 110* (KASH). KASHMIR: *Falconer 273* (fide Stewart, 1972: 476).

According to Ngwe (1971), the bark of this plant is used as an anthelmintic and the roots as a diuretic. The seeds are utilized in the treatment of piles and coughs, and as emollients and demulcents. The leaves are also said to be medicinal.

12. SIDA L., Sp. Pl. 683. 1753; Gen. Pl. 5th Edition. 306. 1754.

About 150 species distributed in the tropics and subtropics of both hemispheres; represented in our area by five species.

KEY TO THE SPECIES OF *SIDA* IN JAMMU AND KASHMIR STATE

1a. Branches, petioles, pedicels, and calyx pubescent with stellate hairs mixed with simple, spreading hairs up to 3 mm long.
  2a. Leaves cordate, palmately nerved; calyx 4–5 mm long; fruit 3–4 mm diam.; mericarps 5, muticous with pilose mucro ..... 1. *S. cordata*
  2b. Leaves usually ovate, suborbicular-subcordate, or lanceolate, penninerved; calyx 5–10 mm long; fruit 5–8 mm diam.; mericarps 9–10, birostrate with apical awns 3–5 mm long covered with stiff reflexed hairs ..... 4. *S. cordifolia*
1b. Branches, petioles, pedicels, and calyx pubescent with stellate hairs only.
  3a. Leaves ovate-oblong; calyx tube subangular; corolla white, 1–1.5 cm diam.; mericarps 7–8, coriaceous; awns connivent, ± inflexed; seeds farinose ..... 5. *S. ovata*
  3b. Leaves elliptic, obovate, oblong or rhomboid; calyx tube not angular; corolla yellow, up to 1 cm diam.; mericarps 5, membranous; awns not connivent, erect; seeds not farinose.
    4a. Leaves 1–6.5 × 0.6–5 cm; flowers subfasciculate; pedicels in fruit up to 1 cm long; mericarps densely stellate-pilose all over ..... 2. *S. yunnanensis*
    4b. Leaves 1–2 × 0.5–1.2 cm; flowers solitary (–paired); pedicels in fruit 1–2 cm long; mericarps pubescent at apex only ..... 3. *S. alba*

1. Sida cordata (Burm. f.) Borssum Waalkes, Blumea 14: 182. 1966; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 483. 1972; Abedin in Nasir & Ali, Fl. W. Pak. 130: 77. 1979; Sharma & Kachroo, Fl. Jammu 1: 109. 1981. *Melochia cordata* Burm. f., Fl. Indica 143. 1768. TYPE: (G).

Sida veronicifolia Lam., Encyl. 1: 5. 1783; Hu, Fl. China, Malvaceae. 23. 1955. *S. humilis* var. *veronicifolia* (Lam.) Masters in Hook. f., Fl. Brit. India 1: 322. 1874.
S. radicans Cav., Diss. 1: 8, tab. 9, f. 3. 1785.
S. morifolia Cav., Diss. 1: 9, tab. 10, f. 2. 1785.
S. humilis Cav., Diss. 5: 277, tab. 134, f. 2. 1788. *S. veronicifolia* Lam. var. *humilis* (Cav.) K. Schum., Fl. Bras. 12(3): 320. 1891.
S. humilocularis L' Hér., Stirp. Nov. 1: 117. bis 56. 1789.

Perennial, prostrate to procumbent herbs. Branches, petioles, pedicels, and calyx stellate-pubescent and villose with long, spreading hairs. Leaves cordate, palmately nerved, stellate-hispid on both surfaces, the hairs adaxially often simple, the apex acuminate, the margin evenly crenate to serrate. Flowers axillary, solitary, fasciculate or subpaniculate; pedicels 1.5–2.5 cm long, in fruit up to 3.5 cm. Calyx 4–5 mm long; lobes deltoid, acuminate. Corolla yellow, 7–10 mm diam., slightly exceeding the calyx. Staminal tube 2–3 mm long, hirsute with simple hairs. Fruit depressed-globose, 3–4 mm diam.; mericarps 5, muticous, membranous, truncate and pilose at apex. Seeds glabrous.

Distribution. Tropical and subtropical regions of the world. Confined in our area to the Jammu region.

Additional specimens examined. INDIA. JAMMU: Gajansu, common; herbs with long trailing branches among hedges, *B. M. Sharma 569* (KASH); Jammu & Kashmir road, *R. R. Stewart s.n.* (RAW).

A distinctive species distinguishable from all other local species by its cordate leaves with palmate venation and by its mucronate mericarps. The species shows great variation in its indumentum and inflorescence. At least two taxa, *Sida veronicifolia* and *S. humilis*, are occasionally recognized on the basis of variation in the inflorescence. In the former the flowers are described as fasciculate or subpaniculate, whereas in the latter they are solitary. However, a close study of herbarium specimens has shown variation in the inflorescence to be continuous, so any division on this basis is not justified. Similarly Cavanilles (Class. Diss. Dec. 5: 277. 1788) distinguished *Sida multicaulis* Cav. and *S. humilis* on the basis of stem pubescence. The former has tomentose-canescent stems, while the latter has scabrous ones. However, Masters (1874) did not see this difference in the Indian material and, accordingly, interpreted *S. multicaulis* as synonymous with *S. humilis*.

2. Sida yunnanensis Hu, Fl. China, Malvaceae. 16, tab. 16, f. 7. 1955; Abedin in Nasir & Ali, Fl. W. Pak. 130: 79. 1979. TYPE: China. Yunnan: *Forrest 11088* (K, BM).

Sida obovata Wallich, Cat. no. 1864. 1828, nom. nud. *S. rhombifolia* var. *obovata* Wallich ex Masters in Hook. f., Fl. Brit. India 1: 324. 1874.

Perennial, suffruticose herbs or undershrubs; almost all parts stellate-pubescent. Leaves variable; elliptic, oblong, oblong-elliptic, rhomboid or obovate, 1–6.5 × 0.6–5 cm, penninerved, the base obtuse or cuneate, the apex obtuse or acutish, margin serrate-crenate, the abaxial surface velutinous, adaxially green and glabrescent. Flowers subfasciculate, axillary and terminating the upper branches; pedicels 3–6 mm long, in fruit up to 1 cm. Calyx 4–6 mm long; lobes triangular, acuminate, carinate at base. Corolla yellow, ± 1 cm diam., slightly longer than calyx. Staminal tube ca.

3 mm long, sparsely hirsute or subglabrous. Fruit depressed-globose, 4–5 mm diam.; mericarps 5, membranous, densely stellate-pilose, birostrate with convergent apical awns less than 1 mm long. Seeds glabrous.

Distribution. Burma, China, India, and Pakistan. In our area confined to the Jammu region, where it is common along roadsides in the Nagrota-Salora area, in orchards at Tilo Talab, Udhowalla, and elsewhere.

Additional specimen examined. INDIA. JAMMU: Nandni, common on roadsides; erect shrubby perennial with yellow flowers, leaves whitish-gray beneath, *B. M. Sharma 688* (KASH).

In having subfasciculate flowers and pubescent birostrate mericarps, this species is close to *Sida spinosa* L. However, the broad elliptic or obovate leaves with very short petioles of the former can easily be differentiated from the ovate-lanceolate, long-petiolate leaves of the latter species.

The plants are said to yield good bast fiber. The roots are used to relieve rheumatism.

3. Sida alba L., Sp. Pl. 2nd Edition. 960. 1753; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 483. 1972; Abedin in Nasir & Ali, Fl. W. Pak. 130: 81. 1979. TYPE: *Linn. Herb. no. 866/2* (LINN).

Perennial, suffruticose, stellate-pubescent herbs. Leaves small, elliptic to obovate, 1–2 × 0.5–1.2 cm, penninerved, evenly crenulate-serrate. Flowers mostly solitary, sometimes paired; pedicels 5–6 mm long, in fruit 1–2 cm. Calyx 4–6 mm long; lobes triangular, acute to acuminate. Corolla yellow, 6–10 mm diam., slightly longer than calyx. Staminal tube 2–3 mm long, hirsute. Fruit depressed-globose, 4–6 mm diam.; mericarps 5, membranous, pubescent at apex, birostrate with convergent apical awns less than 1 mm long. Seeds glabrous.

Distribution. India, Pakistan, and China. In our area apparently confined to Pakistan-occupied area in Jammu Province. Stewart (1972: 483) reported *Sida alba* from Mirpur, Poonch, in Jammu. The *S. alba* of Sharma & Kachroo (1981: 110) has turned out to be *S. yunnanensis*.

The differences between *Sida alba*, *S. spinosa*, and *S. alnifolia* L. seem to be few. In fact, Riedl (1976) cited *S. alba* and *S. alnifolia* as synonyms of *S. spinosa*. However, a thorough study of the type specimens of these three species, together with field observations and analysis of enough herbarium material from different geographical regions is needed to gain an insight into their ranges of variation and to ascertain their relationships.

4. Sida cordifolia L., Sp. Pl. 684. 1753; Masters in Hook. f., Fl. Brit. India 1: 324. 1874; Hu, Fl. China, Malvaceae. 25. 1955; Ngwe, Union Burma J. Life Sci. 4: 207. 1971; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 483. 1972; Riedl in K. H. Rechinger, Fl. Iran. 120: 3. 1976; Abedin in Nasir & Ali, Fl. W. Pak. 130: 83. 1979. TYPE: *Linn. Herb. no. 866/12* (LINN).

Sida herbacea Cav., Diss. 1: 19, tab. 13, f. 1. 1785.
S. holosericea Willd. ex Sprengel, Syst. Veg. 3: 112. 1826.

Perennial, suffruticose herbs; branches, petioles, pedicels, and calyx stellate-hispid and long-villose with simple, spreading hairs ca. 3 mm long. Leaves usually ovate, suborbicular-subcordate or lanceolate, penninerved, the base subcordate or rounded, the apex obtuse or acute, the margin irregularly crenate, uniformly stellate-hirsute on both surfaces, the hairs longer beneath. Flowers axillary, solitary or paired or fasciculate; pedicels 4–7 mm long, in fruit up to 2 cm. Calyx 5–10 mm long; lobes triangular or deltoid, acute to acuminate. Corolla yellow, 1–1.3 cm diam., slightly longer than calyx. Staminal tube 3–5 mm long, hirsute. Fruit subdiscoid, 5–8 mm diam.; mericarps 9–10, stellate-strigose at apex, birostrate with divergent apical awns 3–5 mm long covered with stiff reflexed hairs. Seeds glabrous except hilum.

Distribution. Common in tropical and subtropical countries. Confined to the Jammu region in our area. Jammu: Rajouri (Stewart, 1972: 483); Jammu (Sharma & Kachroo, 1981: 110; Lambert, 1933: 3).

The plant is said to be used as a tonic, emollient, and astringent. The bark is considered useful in urinary troubles.

5. Sida ovata Fôrskal, Fl. Aegypt.-Arab. 124. 1775; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 483. 1972; Riedl in K. H. Rechinger, Fl. Iran. 120: 4. 1976; Abedin in Nasir & Ali, Fl. W. Pak. 130: 86. 1979. TYPE: Arabia, Surdud, *Fôrskal* (C).

Sida grewioides Guill. & Perr. in Guill. et al., Fl. Seneg. Tent. 1: 71. 1830; Masters in Hook. f., Fl. Brit. India 1: 323. 1874.

Perennial, suffruticose herbs with all parts stellate-pubescent. Leaves ovate-oblong, penninerved,

the base cuneate or rounded, the apex obtuse, the margin ± entire towards base, obtusely crenate or crenate-serrate elsewhere, stellate-pubescent on both surfaces. Flowers axillary, solitary or paired; pedicels 5–8 mm long, in fruit 1(–1.5) cm. Calyx 4–6 mm long, the tube slightly angular; lobes triangular-deltoid, acuminate. Corolla white, 1–1.5 cm diam., slightly longer than calyx. Staminal tube to 3 mm long, pubescent. Fruit depressed-globose, 3–5 mm diam.; mericarps 7–8, coriaceous, reticulate toward the margins, glabrous except awns; awns 2, connivent, ca. 0.5 mm long, ± inflexed. Seeds farinose.

Distribution. In drier parts of Africa, Arabia, India, and Pakistan. In our area reported from Mirpur (Pakistan-occupied area) in Jammu Province. Note the following reports: Jammu: Poonch, Mirpur (Lambert, 1933: 3; Stewart, 1972: 483; Sharma & Kachroo, 1981: 110).

Sida spinosa L., Sp. Pl. 683. 1753, has been reported from Jammu by Lambert (1933). This is probably based on misidentification, because *Sharma 688* (KASH) under this name turned out to be *Sida yunnanensis*.

13. MALVASTRUM A. Gray, Mem. Am. Acad. Arts n.s. 3: 21. 1849, nom. conserv.

Fourteen species (Hill, 1982), distributed in tropical and subtropical America and in Australia; one species is known from our area.

Malvastrum coromandelianum (L.) Garcke, Bonplandia 5: 297. 1857; Hu, Fl. China, Malvaceae. 11. 1955; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 481. 1972; Riedl in K. H. Rechinger, Fl. Iran. 120: 36. 1976; Abedin in Nasir & Ali, Fl. W. Pak. 130: 89. 1979; Sharma & Kachroo, Fl. Jammu 1: 109. 1981. *Malva coromandeliana* L., Sp. Pl. 687. 1753. LECTOTYPE: *Linn. Herb. no. 870/3* (LINN).

Malva carpinifolia Desr. in Lam., Encycl. 3: 754. 1789.
Malva tricuspidata Aiton, Hort. Kew. 2nd Edition. 4: 210. 1811. *Malvastrum tricuspidatum* (Aiton) A. Gray, Plantae Wright. 1: 16. 1852; Masters in Hook. f., Fl. Brit. India 1: 321. 1874.

Erect to suberect, herbaceous or suffruticose, sparsely pubescent plants with simple and 4-fid, appressed hairs. Leaves ovate to lanceolate-oblong, coarsely serrate, acute or obtuse; stipules linear-lanceolate, acuminate. Flowers axillary, solitary or fascicled, sessile or with pedicels to 5 mm long. Epicalyx segments 3, linear, persistent. Calyx 5-lobed; lobes ovate, acuminate. Corolla yellow, 1.5–2 cm diam.; petals obliquely obovate, pubescent at base. Staminal tube 2–4 mm long, glabrous, antheriferous only at the apical end. Fruit discoid, ca. 6 mm diam.; mericarps 8–14, reniform, sparsely stellate-pilose, tricuspidate with an apical and 2 dorsal awns at the middle, 1-seeded. Seeds reniform, glabrous.

Distribution. Native to North America, distributed in tropical regions of both New and Old worlds. In our area it occurs in the Jammu region only. Lambert (1933: 3) reported the species from Billawar, Jammu, Mirpur.

Additional specimens examined. INDIA. JAMMU: Rihari, common in waste places; semierect gregarious herbs with yellow flowers, *B. M. Sharma 453* (KASH); Poonch, Bufliaz, 2,000 m, *G. Singh & H. Kiran 775*.

14. URENA L., Sp. Pl. 692. 1753; Gen. Pl. 5th Edition. 309. 1754.

About six species distributed in the warmer regions of both hemispheres; represented in our area by a single species.

Urena lobata L., Sp. Pl. 692. 1753; Masters in Hook. f., Fl. Brit. India 1: 329. 1874; Hu, Fl. China, Malvaceae. 73. 1955; Ngwe, Union Burma J. Life Sci. 4: 206. 1971; Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 484. 1972; Abedin in Nasir & Ali, Fl. W. Pak. 130: 92. 1979; Sharma & Kachroo, Fl. Jammu 1: 111. 1981. LECTOTYPE: *Linn. Herb. no. 873/1* (LINN).

Urena monopetala Lour., Fl. Cochinch. 418. 1790.
U. diversifolia Schum., Danske Vidensk.-Selsk. Nat.-Math. Afd. 4. 4: 82. 1829.

Erect, herbaceous to suffruticose, ± stellate-tomentose plants. Leaves stellate-pubescent on both surfaces, densely so and ± tomentose abaxially, evenly serrate, with a basal nectary on 1–3 middle nerves beneath, variable in shape and size: the lower leaves usually subcordate or suborbicular, angled or shallowly 3-lobed at the apex; the middle leaves ovate; the upper leaves ovate to ovate-elliptic; stipules linear, caducous. Flowers axillary, usually solitary or in fascicles of 2–3; pedicels 2–3 mm long, in fruit up to 5 mm. Epicalyx segments 5, connate basally, linear-lanceolate. Calyx 5-parted, almost as long as the epicalyx; lobes ovate or ovate-lanceolate, keeled. Corolla pink with a darker center, ca. 2 cm diam.; petals obovate, 1–1.5 cm long. Staminal tube ca. 1.5 cm long, antheriferous in the apical part; anthers subsessile. Carpels 5,

style branches and stigmas 10. Fruit subglobose, 1 cm or less diam.; mericarps 5, triangularly obovoid, coriaceous, stellate-pubescent and glochidiate-spiny, shortly awned. Seeds pubescent to glabrescent.

Distribution. Tropical regions of both hemispheres. Confined to the Jammu region in our area. Udhampur (Stewart, 1972: 484).

Additional specimen examined. INDIA. JAMMU: Udhowala Ashram, common in orchards; erect shrubs, 1.2 m high, with pink flowers, leaves variable, *B. M. Sharma 111* (KASH).

A variable species sometimes divided into a number of varieties. Hu (1955), mainly on the basis of leaf shape and the nature and density of hairs, recognized five varieties from China. As we have very little material at hand, no attempt is made to segregate the various varieties at present.

An important fiber-yielding plant. The bast-fiber from the stems is said to be more lasting than jute. In Cuba, Madagascar, Nigeria, and Brazil it is cultivated for making coffee sacks. The roots are used in rheumatism, and the twigs are chewed for relieving toothache.

15. SIDALCEA A. Gray, in Benth. Pl. Hartw. 300. 1848.

About 35 species distributed in western North America, chiefly in California and Oregon; one species has been recorded from our area.

Sidalcea neomexicana A. Gray subsp. **thurberi** (Robinson ex A. Gray) Hitchcock, in Univ. Wash. Publ. Bot. 18. 1957. *S. parviflora* Greene var. *thurberi* Robinson ex A. Gray, Syn. Fl. N. Amer. 11: 305. 1897. TYPE: described from Santa Monica, Los Angeles County, California, U.S.A.

Perennial, erect, glabrescent-glabrous herbs, glaucous throughout. Leaves orbicular, palmately lobed or divided; stipules small, deciduous. Inflorescence terminal, racemose; bracts mostly bifid. Flowers usually polygamodioecious, the pistillate flowers smaller than the perfect or staminate ones. Epicalyx absent; pedicels and calyces stellate-pubescent. Calyx 4–7 mm long; lobes triangular-ovate, acuminate. Corolla rose-purple, 10–16 mm long. Staminal tube biseriate, glabrous except for a few retrorse hairs on the apical portion. Mericarps beaked, reticulate on angles, smooth on back, indehiscent, 1-seeded.

Distribution. From southern Monterey County (Jolon) to eastern San Bernardino County, California, U.S.A.

Additional specimen examined. INDIA. KASHMIR: Srinagar, Emporium Garden, in grassy lands, an escape from cultivation, 4/5/1967, *G. N. Javeid 6* (KASH).

The species is restricted to America, and its occurrence in Kashmir is interesting. It is probable that seeds were brought and raised ornamentally in our area in the 1960s. We have a single specimen identified as "*S. malvaeflora* A. Gray." The specimen comprises a single upper leaf and inflorescence and has been determined by Paul A. Fryxell, as *S. neomexicana* subsp. *thurberi.*

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